# APPENDIX E
# AIR QUALITY

This appendix contains supporting documentation for the assessment of air quality impacts given in Chapter 4, *Affected Environment*, and Chapter 5, *Environmental Consequences*, Section 5.5, *Air Quality*.

The appendix includes the Draft Air Quality Technical Report with the following attachments:

Attachment 1 Exhibits – There are many exhibits referenced in the Draft Air Quality Technical Report. All the exhibits are found in Attachment 1.

Attachment 2 Air Quality Scoping Meeting Materials – Copies of scoping materials are included in this attachment, which includes meeting agendas, meeting minutes, and handout materials distributed for the agency coordination meetings conducted with the Federal, state, and local agencies.

Attachment 3 EDMS Files by Alternative - The location of the electronic computer modeling files for the input and output of the Emissions and Dispersion Modeling System (EDMS) are referenced in Attachment 3.

Attachment 4 EDMS Inventory Output Files by Alternative – The inventory summary printouts from EDMS are included in this attachment. The dispersion results, along with all the input data are in files available electronically (see Attachment 3).

Attachment 5 On-Site GSE Survey Summary and Stationary Source Survey Summary – The reports summarizing the surveys conducted to determine the use of GSE and the operation of stationary sources at the Airport are included in this attachment.

Attachment 6 Construction Emissions Inventory Tables – Construction emissions are provided by task, by year, by alternative.

Attachment 7 MOBILE 6.2 Input and Output Files – The MOBILE 6.2 motor vehicle emission factor computer program files, both input and output, are provided in this attachment.

**Port Columbus International Airport**
**Environmental Impact Statement**

# *DRAFT* Technical Report

## Air Quality Assessment Methodology

**NOTE: This DRAFT Technical Report contains the methodology and procedure used for conducting the air quality assessment required for the Port Columbus International Airport (CMH) Environmental Impact Statement (EIS). It is provided for deliberative purposes only and should not be cited or quoted. This DRAFT Technical Report was developed through coordination with the Federal Aviation Administration (FAA), the U.S. Environmental Protection Agency (USEPA Region 5), the USEPA Office of Transportation and Air Quality, the Ohio Environmental Protection Agency (OEPA), and the Mid-Ohio Regional Planning Commission (MORPC). The data in the report is based on the best available information and is consistent with USEPA-approved methodologies for air quality evaluations. If major components of the project are changed, this report will be revised by FAA as necessary.**

May 2008

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# 1.0 INTRODUCTION AND PROPOSED PROJECT

The Federal Aviation Administration (FAA) is preparing an Environmental Impact Statement (EIS) for the Port Columbus International Airport (CMH or Airport). As the airport sponsor, the Columbus Regional Airport Authority (CRAA) proposes a Federal action to replace Runway 10R/28L with a new runway of approximately the same length. The new runway is proposed to be relocated south of the existing Runway 10R/28L to allow for passenger terminal expansion that will accommodate future aviation demand at the airport. The procedures and methodologies used to develop the existing and future emission database and computer modeling input data are provided in this Air Quality Technical Report.

The FAA is including a review of air quality impacts in the CMH EIS under the following cases:

- 2006 Existing Conditions;
- 2009 Conditions for the State Implementation Plan (SIP) eight-hour ozone attainment year, inventory only[1];
- 2010 Conditions for the SIP one-hour ozone budget (milestone) year, inventory only[1];
- 2012 Alternative A: No Action;
- 2012 Runway Development Alternatives;
- 2012 Accelerated Alternative A: No Action and Sponsor's Proposed Project Alternative;
- 2018 Alternative A: No Action;
- 2018 Runway Development Alternatives; and
- 2018 Accelerated Sponsor's Proposed Project.

## Proposed Project

The airport currently has a set of parallel runways as shown in the photograph in **Figure 1, *Aerial Photograph of the Airport***. The shorter Runway 10L/28R, located north of the passenger terminal area, is 8,000 feet long. The longer Runway 10R/28L is located south of the terminal core[2] and is 10,125 feet long.

[1] The first year of proposed project implementation is not until 2012. However, construction is anticipated to begin in 2009. Therefore, the emission inventories for 2009 and 2010 conditions included estimated construction emissions.

[2] The "terminal core" is intended to refer to the existing passenger terminal and parking garage, and the areas (including parking lots) either side of International Gateway Drive leading from the interstate highway to the passenger terminal.


**FIGURE 1** **Aerial Photograph of the Airport**. Aerial photograph of CMH showing the existing runways, the approximate location of the replacement runway (dotted line), and the orientation to north. Both alternatives (702-foot shift and 800-foot shift) for the proposed replacement runway are illustrated. Positions are approximate.

The proposed project includes:

- Relocation of Runway 10R/28L to the south
- Various construction tasks including a replacement runway and additional taxiways to support the replacement runway
- Installation of navigational aids (NAVAIDS)
- Terminal development
- Roadway improvements
- Parking facility improvements
- Proposed Part 150 noise abatement actions to be implemented upon receipt of the Record of Approval.

# 2.0 OHIO SIP

This section summarizes the status of Ohio's SIP. The Ohio SIP is included in the Ohio Administrative Code,[3] (OAC) Chapter 3745, which recognizes the State's responsibilities under the National Environmental Policy Act (NEPA)[4] and the provisions of the Clean Air Act, including the 1990 Amendments (CAA).[5] According to the Ohio SIP, Franklin County is designated nonattainment for ozone development and fine particulate matter ($PM_{2.5}$) emissions. The following document was referenced for information regarding the expected attainment years in Franklin County, and the emission budgets for the milestone years:[6]

- Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the: Franklin, Delaware, Licking, Fairfield, Madison, and Knox County Ozone Non-Attainment Area and the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County $PM_{2.5}$ Non-Attainment Area , prepared by the Mid-Ohio Regional Planning Commission (MORPC), dated May 10, 2007.

According to the MORPC conformity determination for both ozone and $PM_{2.5}$, the milestone and attainment years for which emission budgets were prepared are 2009, 2018, 2020 and 2030. Both the 2020 and 2030 years are beyond the farthest planning year for the CMH EIS, which is 2018. During scoping coordination meetings, the Ohio Environmental Protection Agency (OEPA) requested that an airport inventory for the 2009 ozone attainment year and the 2010 one-hour ozone SIP budget year be included in the air quality assessment, along with an inventory of the year during which the total direct and indirect emissions from the action is expected to be the greatest on an annual basis.

The conformity determination data for 8-hour ozone from MORPC's Table 10 is reproduced in **Figure 2**. The conformity determination data for $PM_{2.5}$ from MORPC's Table 15 is reproduced in **Figure 3**. The MORPC analysis used the U.S. Environmental Protection Agency (USEPA) MOBILE6.2 program to generate emission factors for motor vehicles for the conformity analysis. The MOBILE6.2 input and output files, along with the reference files required to run the emission factor calculations for the Franklin County conformity analyses, were provided to the FAA consultant by MORPC.[7] These files were used to generate emission factors for motor vehicles for the EIS analysis of motor vehicle emissions.

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[3] Ohio Administrative Code (OAC) Chapter 3745 *Ohio Environmental Protection Agency* , available on the Internet at http://www.epa.gov/reg5oair/ sips/ohio.pdf

[4] Ohio Administrative Code (OAC), Chapter 3745-102-04, *Conformity Regulations (Purpose)*, effective date May 10, 1996, available on the Internet at http://www.epa.gov/reg5oair/ sips/ohio.pdf

[5] Ohio Administrative Code (OAC) Chapter 3745-102-03 *Conformity Regulations (Applicability)*, effective date May 10, 1996, available on the Internet at http://www.epa.gov/reg5oair/ sips/ohio.pdf

[6] Email from Chris Gawronski, Principal Planner, Mid-Ohio Regional Planning Commission to Ginny Raps, Landrum and Brown. July 30, 2007. Subject: MORPC air quality info – CORRECTION.

[7] MOBILE6.2 files were provided to Landrum & Brown, via an e-mail transmission from Chandra Parasa, MORPC, on April 9, 2007.

**Conformity Determination**

Table 10 illustrates that the emissions for VOC and $NO_x$ are less than their corresponding budgets. Thus, the MORPC and LCATS 2030 Transportation Plans are in conformity with the requirements of the CAAA and the SIP.

**Table 10: TIP Air Quality Analysis for the Columbus Ozone Nonattainment Area**

| | VOC (tons/day) | Budget (tons/day) | NOx (tons/day) | Budget (tons/day) |
|---|---|---|---|---|
| 2009 Build | 62.633 | 72.160 | 108.534 | 125.430 |
| 2018 Build | 35.941 | 41.500 | 48.788 | 56.300 |
| 2020 Build | 33.089 | 41.500 | 42.169 | 56.300 |
| 2030 Build | 33.419 | 41.500 | 33.134 | 56.300 |

Source: Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the: Franklin, Delaware, Licking, Fairfield, Madison, and Knox County Ozone Non-Attainment Area and the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County $PM_{2.5}$ Non-Attainment Area, prepared by the Mid-Ohio Regional Planning Commission (MORPC), dated May 10, 2007.

**FIGURE 2 Conformity Determination for the Ozone Nonattainment Area.**

**Conformity Determination**

The conformity test for the Columbus PM2.5 nonattainment area consisting of the modeled counties of Franklin, Delaware and Licking, the modeled portion of the Fairfield county and the HPMS-based areas of Fairfield County and Coshocton County is the "no greater than 2002 Baseline Interim Conformity Test." Table 15 illustrates that the emissions for $NO_x$ and PM2.5 are less than the 2002 baseline level.

**Table 15: TIP Air Quality Analysis for the Columbus PM2.5 Nonattainment Area**

| | NOx (tons/year) | 2002 Emissions (tons/year) | PM 2.5 (tons/year) | 2002 Emissions (tons/year) |
|---|---|---|---|---|
| 2009 Build | 36,172 | 51,434 | 583 | 858 |
| 2018 Build | 16,298 | 51,434 | 347 | 858 |
| 2020 Build | 13,947 | 51,434 | 346 | 858 |
| 2030 Build | 10,884 | 51,434 | 367 | 858 |

Source: Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the: Franklin, Delaware, Licking, Fairfield, Madison, and Knox County Ozone Non-Attainment Area and the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County $PM_{2.5}$ Non-Attainment Area, prepared by the Mid-Ohio Regional Planning Commission (MORPC), dated May 10, 2007.

**FIGURE 3 Conformity Determination for the $PM_{2.5}$ Nonattainment Area.**

The 2009 budget for the ozone nonattainment area were originally presented in tons per day by MORPC, as shown in Figure 2. The budgets were converted to tons per year in **Table 1**. There is no emission budget for the 2010 milestone year in the MORPC document.

**Table 1**
**MORPC TRANSPORTATION IMPROVEMENT PROGRAM (TIP) AIR QUALITY ANALYSIS FOR THE COLUMBUS OZONE AND $PM_{2.5}$ NONATTAINMENT AREAS**

| YEAR | ANNUAL BUDGETED EMISSIONS (tons per year) | | | |
|---|---|---|---|---|
| **DATA FROM THE MAY 2007 TIP REPORT - TABLE 10 AND TABLE 15** | | | | |
| **YEAR** | **OZONE** | | **$PM_{2.5}$ EMISSIONS** | |
| | **VOC** | **$NO_X$** | **$NO_X$** | **$PM_{2.5}$** |
| 2009 | 26,338 | 39,615 | 36,172 | 583 |
| 2018 | 15,148 | 17,808 | 16,298 | 347 |
| 2020 | 15,148 | 15,392 | 13,947 | 346 |
| 2030 | 15,148 | 12,094 | 10,884 | 367 |
| **10 PERCENT LIMIT FOR REGIONAL SIGNIFICANCE (**Refer to Section 3.2) | | | | |
| **YEAR** | **OZONE** | | **$PM_{2.5}$ EMISSIONS** | |
| | **VOC** | **$NO_X$** | **$NO_X$** | **$PM_{2.5}$** |
| 2009 | 2,634 | 3,961 | 3,617 | 58 |
| 2018 | 1,515 | 1,781 | 1,630 | 35 |
| 2020 | 1,515 | 1,539 | 1,395 | 35 |
| 2030 | 1,515 | 1,209 | 1,088 | 37 |

Note: MORPC is Mid-Ohio Regional Planning Commission.

Source: Mid-Ohio Regional Planning Commission (MORPC), *Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the: Franklin, Delaware, Licking, Fairfield, Madison and Knox County Ozone Non-Attainment Area and the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County $PM_{2.5}$ Non-Attainment Area*, Table 10 and Table 15, VOC and $NO_x$ data for ozone converted to tons per year, May 10, 2007.

# 3.0. REGULATORY REQUIREMENTS

The assessment of air quality was prepared in accordance with the guidelines provided in the FAA *Air Quality Procedures for Civilian Airports & Air Force Bases,*[8] and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, which together with the guidelines of FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, constitutes compliance to all the relevant provisions of NEPA and the CAA.

[8] FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.

## 3.1 NEPA

NEPA requires compliance to Section 176(c)(1) of the CAA. This section of the CAA requires Federal agencies to ensure project compliance to the National Ambient Air Quality Standards (NAAQS). The USEPA established the standards, or "criteria," for seven pollutants determined to be harmful to human health and welfare[9] and are listed below. The standards for each pollutant are given in **Table 2** and are valid for Federal and Ohio regulatory purposes.[10]

- Ozone ($O_3$)
- Carbon monoxide (CO)
- Nitrogen dioxide ($NO_2$)
- Particulate matter ($PM_{10}$ and $PM_{2.5}$)[11]
- Sulfur dioxide ($SO_2$)
- Lead (Pb)

For each of these pollutants, the USEPA established primary standards intended to protect public health, and secondary standards for the protection of other aspects of public welfare, such as preventing materials damage, preventing crop and vegetation damage, and assuring good visibility. Areas of the country where air pollution levels consistently exceed these standards may be designated "nonattainment" by the USEPA. Such is the case in Franklin County for ozone and $PM_{2.5}$.

When dispersion modeling is conducted for a NAAQS compliance assessment, the analysis should meet the requirements of 40 CFR Part 93.158(b)(1 and 2):

93.158(b) The area wide and/or local air quality modeling analyses must:

(1) Meet the requirements in 40 CFR Part 93.159;[12] and
(2) Show that the action does not:
    (i) cause or contribute to any new violation of any standard in any area; or
    (ii) increase the frequency or severity of any existing violation of any standard in any area.

---

9 Title 40 of the Code of Federal Regulations (40 CFR) Part 50 *National Primary and Secondary Ambient Air Quality Standards (*NAAQS).
10 Ohio Administrative Code (OAC) Chapter 3745 Sections 17-02, 18-02, 21-02, and 71-03..
11 $PM_{10}$ and $PM_{2.5}$ are airborne inhalable particles that are less than 10 micrometers and less than 2.5 micrometers in diameter, respectively. $PM_{2.5}$ is a subset of $PM_{10}$ emissions.
12 40 CFR Part 93.159 outlines the procedures for conformity determinations of general Federal actions and includes planning assumptions, vehicle emission modeling, and gives the required years of analysis.

**Table 2**
**NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)**

| POLLUTANT | AVERAGING PERIOD | PRIMARY STANDARDS | SECONDARY STANDARDS |
|---|---|---|---|
| Sulfur Dioxide ($SO_2$) | Annual Arithmetic Mean | 80 $\mu g/m^3$ (0.03 PPM) | None |
| | 24-Hour Average | 365 $\mu g/m^3$ (0.14 PPM) | None |
| | 3-Hour Average | None | 1,300 $\mu g/m^3$ (0.50 PPM) |
| Particulate Matter ($PM_{10}$) | 24-Hour Average | 150 $\mu g/m^3$ | 150 $\mu g/m^3$ |
| Particulate Matter ($PM_{2.5}$) | Annual Arithmetic Mean | 15 $\mu g/m^3$ | 15 $\mu g/m^3$ |
| | 24-Hour Average | 35 $\mu g/m^3$ | 35 $\mu g/m^3$ |
| Carbon Monoxide (CO) | 8-Hour Average | 10,000 $\mu g/m^3$ (9 PPM) | None |
| | 1-Hour Average | 40,000 $\mu g/m^3$ (35 PPM) | None |
| Ozone ($O_3$) | 8-Hour Average | 0.08 PPM | 0.08 PPM |
| | 1-Hour Average | 0.12 PPM | 0.12 PPM |
| Nitrogen Dioxide ($NO_2$) | Annual Arithmetic Mean | 100$\mu g/m^3$ (0.053 PPM) | 100$\mu g/m^3$ (0.053 PPM) |
| Lead (Pb) [1] | 3-Month Arithmetic Mean | 1.5 $\mu g/m^3$ | 1.5 $\mu g/m^3$ |

Note: $\mu g/m^3$ is micrograms per cubic meter and PPM is parts per million.

[1] Airborne lead in urban areas is primarily emitted by vehicles using leaded fuels. The chief source of lead emissions at airports would be the combustion of leaded aviation gasoline in small piston-engine general aviation aircraft. However, the USEPA and FAA have determined that an exceedance of the lead standard would be unlikely at an airport because of the use of low-lead fuel for piston-engine aircraft. Therefore, emissions of lead were not considered in this analysis.

Sources: 40 CFR Parts 50.4 through 50.12.
FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
Ohio Administrative Code (OAC), Chapter 3745.

In FAA Order 1050.1E, the FAA and USEPA determined that an analytical assessment of compliance to the NAAQS (referred to as a NEPA assessment)[13] due to a Federal airport action is not always required or necessary. Rather, the requirement is dependent upon the nature of the project and the size of the airport as evaluated through the application of screening criteria.[14] The screening criteria consider two factors: the annual number of passengers[15] and the number of combined general aviation and air taxi aircraft operations at the airport. An airport that accommodates or projects to accommodate more than 2.6 million annual passengers (or 1.3 million annual enplanements) or an airport that operates or projects to operate more than 180,000 combined general aviation and air taxi aircraft operations annually, then an analysis to assess the Federal action against the NAAQS should be considered. The relationship between these two factors is incorporated into the following equation, which should be used as a guide for determining whether a NEPA assessment should be considered for an airport project:[16]

$$3.5 - [(1.346 \times MAP) + (0.0194 \times GA)] < 0$$

Where, MAP is the millions of annual passengers, and GA denotes the combined annual general aviation and air taxi aircraft operations, given in 1,000's. When this statement is true, a NEPA assessment is indicated; if false, and the solution is >0, then a NEPA assessment would not be required. There are approximately 184,500 combined GA and air taxi aircraft operations each year at CMH. Application of this data to the above equation, regardless of the number of enplanements, indicates that a NEPA assessment would be required for a proposed Federal action at CMH. The NEPA assessment would specifically examine the pollutant concentrations (in parts per million) of $NO_X$, $SO_X$, $PM_{10}$, $PM_{2.5}$, and CO under the Federal action and compare the results with the NAAQS.

## 3.2 CLEAN AIR ACT

The CAA established the provision that a SIP will include the strategy that a state environmental agency intends to use to meet and maintain the NAAQS within a given timeframe. To ensure Federal projects will comply with the NAAQS and not interfere with the goals of the SIP, the USEPA promulgated the conformity regulations on November 24, 1993[17] - the Transportation Conformity Rule for Federal highway and transit projects, and the General Conformity Rule for all other general Federal actions, including airport improvement projects.

13 FAA, *Air Quality Procedures for Civilian Airports & Air Force Bases,* September 2004 Addendum, Parag. 2.1.2, p. AD-7, April 1997.
14 The requirement for a NAAQS assessment would also depend on whether the Federal action is exempt or advisory in nature. The CMH Proposed Project is neither exempt nor an advisory.
15 Includes enplanements and deplanements, and transfer passengers, but excludes through passengers.
16 FAA, *Air Quality Procedures for Civilian Airports & Air Force Bases,* April 1997.
17 Federal Register Volume 58, p. 62188 (58 FR 62188), dated November 24, 1993.

Compliance to the SIP requires the sponsoring Federal agency to prepare an analytical demonstration of the potential for significant air quality impacts from Federal actions unless the action is exempt under the CAA regulations, or is a project included in the sponsoring agency's Presumed to Conform List.[18]

### *General Conformity Rule Applicability*

The General Conformity Rule under the CAA establishes minimum values, referred to as the de minimis thresholds, for the criteria and precursor pollutants[19] for the purpose of:

- Identifying Federal actions with project-related emissions that are clearly negligible (*de minimis*);
- Avoiding unreasonable administrative burdens on the sponsoring agency; and,
- Focusing efforts on key actions that would have potential for significant air quality impacts.

Notably, there are no de minimis thresholds to account for ozone in the atmosphere. This is because ozone is not directly emitted from a source. Rather, ozone is formed through photochemical reactions involving emissions of nitrogen oxides ($NO_X$), volatile organic compounds (VOC), and abundant sunlight. Therefore, the formation of ozone on a project level is evaluated based on emissions of the ozone precursor pollutants, $NO_X$ and VOC.

Although $PM_{2.5}$ is sometimes emitted directly, fine particle emissions can form resulting from chemical reactions involving emissions of the $PM_{2.5}$ precursor pollutants $NO_X$, VOC, sulfur oxides ($SO_X$), and ammonium ($NH_4$).

Conformity to the *de minimis* thresholds is relevant only with regard to the pollutants and precursor pollutants for which the area is nonattainment or maintenance. The *de minimis* rates vary depending on the severity of the nonattainment area and further depend on whether the general Federal action is located inside an ozone transport region.[20] The General Conformity Rule (the Rule), published under 40 CFR Part 93,[21] applies only to general Federal actions that are:

[18] The Proposed Project at CMH is neither exempt nor is the project included on the FAA Presumed to Conform List.

[19] Precursor pollutants are pollutants that are involved in the chemical reactions that form the resultant pollutant. Ozone precursor pollutants are $NO_x$ and VOC, whereas $PM_{2.5}$ precursor pollutants include $NO_x$, VOC, $SO_x$, and ammonium ($NH_4$).

[20] An ozone transport region (OTR) is a single transport region for ozone (within the meaning of Section 176A(a) of the CAA), comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia, as given at Section 184 of the CAA.

[21] USEPA, 40 CFR Part 93, Subpart B *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, July 2006.

Federally-funded or Federally-approved:

- Not a highway or transit project;
- Not identified as an exempt project[22] under the CAA;
- Not a project identified on the approving Federal agency's Presumed to Conform list;[23] and,
- Located within a nonattainment or maintenance area.

Otherwise, the Federal action is not applicable under the Rule. When the action is applicable under the Rule, the net emissions due to the Federal action may not equal or exceed the applicable *de minimis* thresholds unless:

- An analytical demonstration is provided that shows the emissions would not exceed the NAAQS; or
- Net emissions are accounted for in the SIP planning emissions budget; or,
- Net emissions are otherwise accounted for by applying a solution prescribed under 40 CFR Part 93.158.

The Federal *de minimis* thresholds, which are adopted by reference in the Ohio Administrative Code,[24] are given in **Table 3**, ***Clean Air Act De Minimis Thresholds***.

Franklin County is included in a nonattainment area for both ozone and emissions of $PM_{2.5}$; further, the Proposed Project meets all the remaining criteria indicating the general conformity regulations would apply to the Proposed Project for CMH. Because Franklin County is nonattainment for ozone, project-related net emissions of the ozone precursor pollutants, $NO_X$ and VOC, would be evaluated in the air quality assessment for this EIS and net emissions would be compared against the minimum threshold of 100 tons per year, each.

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[22] The CMH Proposed Project is not listed as an action exempt from a conformity determination pursuant to 40 CFR Part 93.153(c). An exempt project is one that the USEPA has determined would clearly have no impact on air quality at the facility, and any net increase in emissions would be so small as to be considered negligible.

[23] The provisions of the CAA allow a Federal agency to submit a list of actions demonstrated to have low emissions that would have no potential to cause an exceedance of the NAAQS and are presumed to conform to the CAA conformity regulations. This list would be referred to as the "Presumed to Conform" list. The FAA published the Final Notice for their Presumed to Conform List July 30, 2007. Department of Transportation Federal Aviation Administration Federal Presumed To Conform Actions Under General Conformity Final Notice Federal Register Vol. 72, No 145. July 30, 2007.

[24] Ohio Administrative Code (OAC) Chapter 3745-102-03 *Conformity Regulations (Applicability)*, effective date May 10, 1996 (last updated April 21, 1999), available on the Internet at http://www.epa.gov/reg5oair/sips/ohio.pdf

## Table 3
## CLEAN AIR ACT *DE MINIMIS* THRESHOLDS

| **POLLUTANT TYPE AND VIOLATION SEVERITY** | **NONATTAINMENT AREA THRESHOLD EMISSIONS** (tons per year) | **MAINTENANCE AREA THRESHOLD EMISSIONS** (tons per year) |
|---|---|---|
| **Carbon Monoxide** (CO) | 100 | 100 |
| **Particulate Matter** ($PM_{10}$) | | 100 |
| Moderate Nonattainment Area | 100 | |
| Serious Nonattainment Area | 70 | |
| **Particulate Matter** ($PM_{2.5}$) | 100 | 100 |
| Precursor pollutants $SO_2$, $NO_X$, VOC, & $NH_4$[1] | 100 | 100 |
| **Sulfur Dioxide** ($SO_2$) | 100 | 100 |
| **Nitrogen Dioxide** ($NO_2$) | 100 | 100 |
| **Lead** (Pb) | 25 | 25 |
| **Ozone**[2] ($O_3$) | *VOC/$NO_X$* | *VOC/$NO_X$* |
| Serious Nonattainment Area | 50/50 | |
| Severe Nonattainment Area | 25/25 | |
| Extreme Nonattainment Area | 10/10 | |
| *Inside an ozone transport region*[3]: | | 50/100 |
| Marginal Nonattainment Area | 50/100 | |
| Moderate Nonattainment Area | 50/100 | |
| *Outside an ozone transport region*[3]**:** | | 100/100 |
| Marginal Nonattainment Area | 100/100 | |
| Moderate Nonattainment Area | 100/100 | |

[1] $NH_4$ is the chemical formula for ammonium (ammonia), a precursor pollutant that aids in the development of $PM_{2.5}$. Net emissions of pollutants identified by USEPA as precursors, or contributors, to $PM_{2.5}$ emissions include $SO_X$, $NO_X$, VOC, and $NH_4$, and are each limited to net emissions of 100 tons per year in a $PM_{2.5}$ nonattainment or maintenance area.

[2] The rate of increase of ozone emissions is not usually evaluated in an environmental review because the formation of ozone occurs on a regional level and is the result of the photochemical reaction of $NO_X$ and VOC in the presence of abundant sunlight. Therefore, USEPA considers the rates of increase of $NO_X$ and VOC emissions to reflect the likelihood of ozone formation on a project level.

[3] An ozone transport region (OTR) is a single transport region for ozone, comprised of the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia.

Source: 40 CFR Part 93.153(b)(1), July 2006.
CAA Title 1, Section 176A(a) and Section 184.
71 FR 17003, April 5, 2006, *$PM_{2.5}$ De Minimis Emission Levels for General Conformity Applicability*.

Like ozone, the Proposed Project's net emissions of $PM_{2.5}$ and the precursor pollutants[25] $SO_X$, $NO_X$, and VOC would be compared against the minimum threshold of 100 tons per year, each. If the general conformity evaluation for this air quality assessment were to show that any of these thresholds were equaled or exceeded due to the Proposed Project, further more detailed analysis to demonstrate conformity would be required, referred to as a General Conformity Determination.

If the general conformity evaluation were to show that none of the thresholds were equaled or exceeded, the Proposed Project at CMH would be assumed to conform to the Ohio SIP and no further analysis would be required under the Rule unless the project is shown to be regionally significant under the general conformity regulations.

***Regional Significance Under General Conformity***

A regionally significant Federal action under the CAA is one where the total direct and indirect emissions (net emissions) represent greater than ten percent of the total emissions of any pollutant in the nonattainment or maintenance area, as provided in the SIP emissions budget. According to the USEPA and the FAA, it would be unlikely that an airport improvement project would cause an increase in net emissions that is regionally significant.[26] Refer to Table 1 for the calculation of the maximum allowable net emissions under the General Conformity regional significance provisions for Franklin County.

***Transportation Conformity Rule Applicability***

Although airport improvement projects are considered general Federal actions, there are elements of a proposed airport project alternative that may require an analysis to show transportation conformity, such as actions relating to transportation plans, programs, or projects developed, funded, or approved under Title 23 United States Code (U.S.C.) or the Federal Transit Act.[27] In such cases, the sponsoring Federal agency would be required to coordinate with the Federal Highway Administration (FHWA), the State Department of Transportation (DOT), and the local metropolitan planning organization (MPO) to assist in completing a transportation conformity evaluation. As with General Conformity, Transportation Conformity regulations apply only to Federal actions located within a nonattainment or maintenance area.

The Proposed Project at CMH includes the realignment of a short section of Stelzer Road; however, realignment of this roadway is not a highway or transit project requiring FHWA or DOT approval.[28] Therefore, the Transportation Conformity regulations would not apply to the CMH Proposed Project.

***Indirect Source Review***

[25] Emissions of ammonium ($NH_4$) are generally associated with commercial animal agriculture, including feeding operations. Therefore, emissions of $NH_4$ were not included in this analysis.
[26] FAA, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
[27] USEPA, 40 CFR Part 93.153, *Applicability*, July 2006.
[28] USEPA, 40 CFR Part 51.394, *Applicability*, July 2006.

Some states require an air quality review when a Federal action has the potential to cause an increase in net emissions from indirect sources. Indirect sources cause emissions that occur later in time or are farther removed from the Federal action. Depending on the state, indirect sources may be identified as motor vehicles on highways, parking at sports and entertainment facilities, or an increase in aircraft operations. The state requirement is referred to as the Indirect Source Review (ISR) and each state requiring an ISR sets thresholds for increased operation of the indirect sources. When a Federal action has the potential to exceed these thresholds, an air quality review is required to assess the character and impact of the additional emissions, which is an evaluation separate from the analyses required under NEPA or the CAA. According to FAA, *Air Quality Procedures for Airports and Air Force Bases*,[29] Ohio is not listed as one of the states requiring an ISR.

# 4.0 MODELING APPROACH

The air quality assessment includes the following analyses:

- Criteria and precursor pollutant emission inventory;
- Construction equipment emissions inventory; and
- Dispersion analysis for criteria pollutants (excluding lead and ozone).

## 4.1 EMISSIONS INVENTORY OF CRITERIA AND PRECURSOR POLLUTANTS

A local-area[30] inventory of all direct and indirect emissions was prepared to disclose the air quality impact of the existing conditions and the relevant project alternatives, including the future baseline conditions. The future project emissions were compared to the future baseline emissions to disclose the net emissions and the potential for significant impact to air quality under each relevant project alternative. The net emissions due to the preferred alternative[31] were compared to the *de minimis* threshold to determine compliance to the General Conformity Rule under the CAA. The emission inventories include estimated emissions in tons per year for the following criteria and precursor pollutants:

- Carbon monoxide (CO)
- Volatile organic compounds (VOC)
- Nitrogen oxides ($NO_X$)
- Sulfur oxides ($SO_X$)
- Particulate matter ($PM_{10}$ and $PM_{2.5}$)

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29 FAA, *Air Quality Procedures for Civilian Airports & Air Force Bases*, Appendix J, April 1997.

30 A local-area inventory focuses on emissions over a relatively limited area from a single source or closely related sources, which is in contrast with a regional emissions inventory typically prepared by the metropolitan planning organization (MPO) for the regional transportation system.

31 The preferred alternative is defined as the project alternative relevant for evaluation under general conformity regulations and the alternative that would ultimately be funded or approved by the FAA.

- Volatile organic compounds (VOC)

The emission inventories were estimated using the FAA Emissions and Dispersion Modeling System (EDMS) computer model Version 4.5., applying average annual meteorological conditions for temperature and mixing height. The FAA EDMS computer program is the FAA-required and USEPA-approved model for estimating emissions and calculating pollutant concentrations from airport-specific sources, such as aircraft engines, ground support equipment (GSE) and auxiliary power units (APUs). The model is also approved for modeling emissions from motor vehicles on roadways and in parking lots, and modeling emissions from stationary sources such as heating plants (boilers), fuel storage tanks, and generators.

## 4.2 CONSTRUCTION EMISSIONS INVENTORY

An inventory of emissions from the use of construction equipment is a regulatory requirement because construction equipment is considered a direct source of emissions due to a development project.

The construction equipment emissions inventory was prepared using USEPA-approved methodology and equipment emission factors from the USEPA NONROAD computer model database and 40 CFR Part 89.[32] Emission factors for the Tier 2, Tier 3, and Tier 4 emission standards for nonroad diesel engines applicable for the three years previous to the commencement of construction were used for calculation of the inventory.[33] This allows the construction contractor the opportunity to use readily available tier-compliant equipment. The emission inventory from construction equipment was prepared using the Microsoft EXCEL® spreadsheet program and applied the use of construction equipment by type (i.e. bulldozer, backhoe), by horsepower, by load factor, and by hours of use to complete each construction task. [34]

## 4.3 DISPERSION ANALYSIS

A dispersion analysis was conducted based on the emission inventory of all airport sources (excluding construction), for existing conditions and for all the future alternatives, including the future baseline conditions. The dispersion analysis was conducted using the EDMS computer model and applied one full year of meteorological data (surface observations and upper air data). Refer to Section 5.0, *Meteorology*.

32 40 CFR Part 89.112 *Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards*.
33 40 CFR Part 89.
34 FAA letter from Ms. Katherine Jones to USEPA, dated October 17, 2006; reference Comment #3 of the memorandum attached to the letter, which relates to construction emissions.

Dispersion modeling typically creates very large files that must be manipulated during calculations. Individual files may be as large as 1.5 gigabyte (GB) and one "study," which is the directory containing all the EDMS input and output files may be as large as 3GB.

The dispersion analysis using EDMS was run on a five-computer system with the following parameters for each unit:

- Windows XP Professional 2002, Service Pack 2
- Intel Pentium D Central Processing Unit (CPU) ™ 3.00 Gigahertz (GHz)
- 2GB Random-Access Memory (RAM)
- 74GB Hard Drive

The dispersion analysis was conducted for the criteria pollutants (excluding ozone and lead, and not including VOC,[35] the ozone precursor pollutant). Dispersion modeling was applied to all the scenarios listed in Section 1.0, *Introduction*, except the 2009 and 2010 SIP years, which require an emission inventory and not dispersion modeling. The same sources evaluated for the emission inventory were evaluated through dispersion modeling.

# 5.0 METEOROLOGY

Local meteorology can affect pollutant concentrations depending on the severity of temperature inversions that occur in the morning and late in the afternoon. A temperature inversion occurs when the upper air is warmer than the air near the ground. This causes air pollutants released at the surface to be trapped beneath the level where the air begins to warm. An illustration of a temperature inversion is shown in **Figure 4**, ***Temperature Inversion***.

Mixing heights are calculated at National Weather Service Forecast Office (NWSFO) upper-air stations every morning (1200 Coordinated Universal Time, UTC)[36] and again in the afternoon (0000 UTC). Upper-air observations are conducted using a balloon filled with helium or hydrogen gas that is released with an attached radio-transmitter that transmits data, including atmospheric pressure, wind speed, wind direction, temperature, and water vapor content, directly into a computer processor that calculates the mixing height. The calculated mixing height is used to calculate the inventory of aircraft emissions

[35] There is no NAAQS for VOC, therefore, VOC was not included in the dispersion analysis.

[36] Coordinated Universal Time, UTC, sometimes referred to as Greenwich Mean Time (GMT), or Zulu time (Z), is the local time at the Greenwich Observatory outside London, England, the location of the prime meridian (zero degrees longitude), and is based on the atomic clock. All upper-air observations in the U.S. are conducted at or near 0000 UTC (midnight) and 1200 UTC (noon) so that all upper-air observations commence at approximately the same time providing a "snapshot" of the weather across the U.S. The "morning" upper-air observations in the U.S. generally coincide with the noon hour (1200 UTC) in Greenwich; the "afternoon" observations in the U.S. generally coincide with the midnight (0000 UTC) observation in Greenwich.

The calculation of emissions from aircraft assumes that aircraft operate only within the mixing layer, below the mixing height, where the emissions may influence ground-based pollutant concentrations. The mixing height, combined with the angle of approach (usually 3 degrees above the horizon) and the departure angle, determines the total time an aircraft operates during approach and climbout.

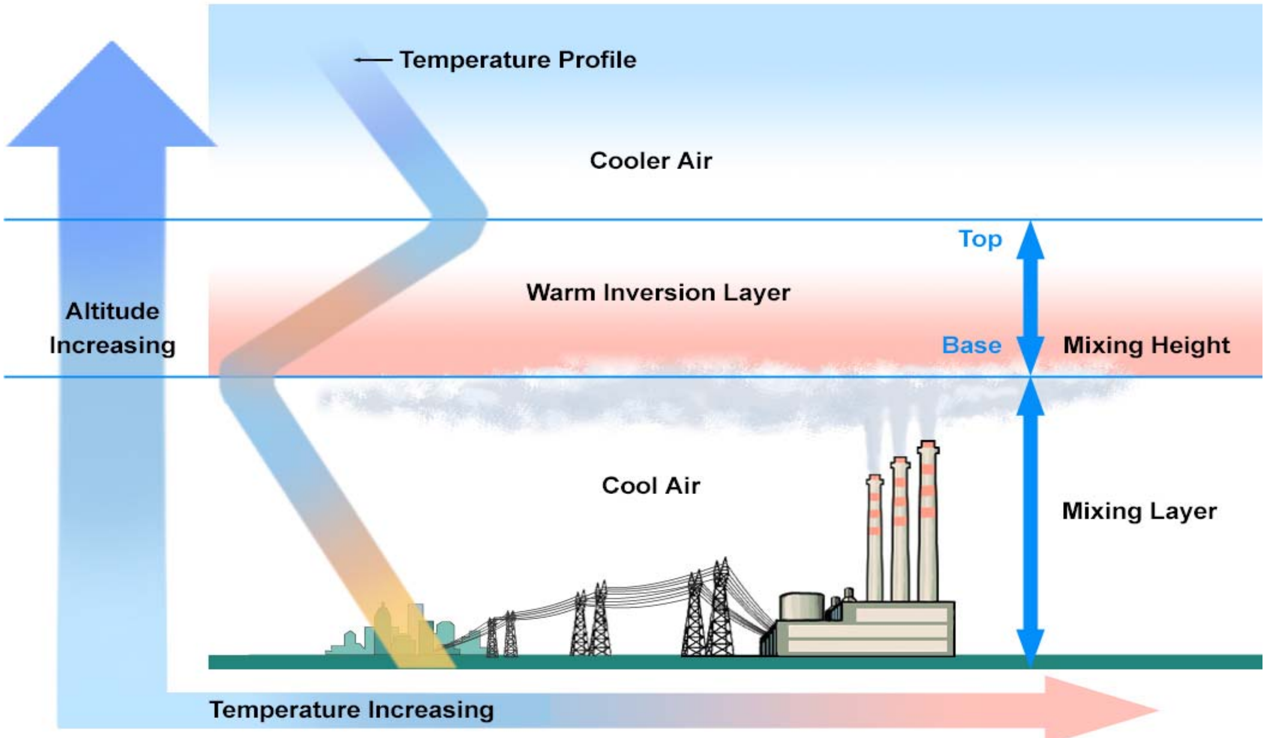


**FIGURE 4** **Temperature Inversion.** Pollutants released within the mixing layer are trapped in the cool air below the mixing height, which acts as a "cap." A relatively low mixing height causes pollutants to be forced downward in the sinking air, resulting in higher pollutant concentrations at ground level.

The inventory calculations required the average annual temperature and the average annual mixing height. The values are provided in **Table 4**, ***Meteorological Parameters for the Emission Inventory***.

Dispersion calculations require one full year of meteorological data that includes several parameters such as temperature, pressure, relative humidity, wind speed, and wind direction for each hour of the year. The USEPA requested that five years of data beginning with the year 2001 and ending with the year 2005 be used in the analysis for CMH. Five years of hourly surface aviation meteorological data was obtained from the National Climatic Data Center (NCDC) for CMH. In addition, five years of upper air data required for the analysis was also obtained from NCDC for the nearest upper-air station to the airport, which is the Wilmington National Weather Service Office. Refer to **Table 5**, ***Meteorological Data for Dispersion Analysis.***

## TABLE 4
## METEOROLOGICAL PARAMETERS FOR THE EMISSION INVENTORY
## PORT COLUMBUS INTERNATIONAL AIRPORT

| METEROLOGICAL PARAMETER | VALUE | SOURCE |
|---|---|---|
| Average Annual Temperature | 52.9 Deg. F | 1971-2000 NCDC Normals for Columbus WSO Airport, OH (COLUMBUS INTL AP, FRANKLIN CO.), *Historic Climate Data: Temperature Summary*, Midwestern Regional Climate Center, U.S. Cooperative Network, a cooperative program of the Illinois State Water Survey and the National Climatic Data Center (NCDC), http://mcc.sws.uiuc.edu/climate_midwest/historical/temp/oh/331786_tsum.html |
| Average Annual Mixing Height | 3,052 feet | USEPA, Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States, AP-101, January 1972, Table B-1, *Mean Seasonal and Annual Morning and Afternoon Mixing Heights and Wind Speeds for NOP and All Cases*. |

Note: WSO is Weather Service Office.
NOP refers to no precipitation.
Deg. F refers to degrees Fahrenheit.

## TABLE 5
## METEOROLOGICAL DATA FOR DISPERSION ANALYSIS
## PORT COLUMBUS INTERNATIONAL AIRPORT

| DATA REQUIREMENT | SOURCE |
|---|---|
| Hourly Surface Aviation Observations | National Climatic Data Center (NCDC) for Port Columbus International Airport, collected by the National Weather Service, Columbus, Ohio. |
| Upper-Air Observations | National Climatic Data Center (NCDC), collected by the National Weather Service, Wilmington, Ohio. |

### *Procedure for Applying Weather Data and Determination of Worst-Case Meteorological Year*

According to the letter from Ms. Katherine Jones, FAA Community Planner, dated October 17, 2006, Comment #1,[37] a teleconference was held October 2, 2006, to determine the number of years of meteorological data would be applied to dispersion modeling for the CMH EIS. The following is quoted from the minutes summarizing the teleconference proceedings:

> "The modeling is done with 5 years of met data for the base case. Then the worst-case year is chosen and used to evaluate the alternatives in the EIS. When the final alternative is chosen, then the alternative is run with the 5 years of met data. USEPA and the Ohio Environmental Protection Agency (OEPA) concurred with this approach."

The procedure for selection of the worst—case meteorological year was based on the guidelines provided in the *Use of Meteorological Data in Air Quality Trend Analysis* [38] and based on coordination with Ohio Environmental Protection Agency (OEPA), USEPA Region 5, and MORPC.

According to the USEPA publication referenced above, variations in pollutant concentrations when calculated as a one-hour to 24-hour average, are primarily due to meteorology. This indicates that averaging periods greater than 24 hours may not be sensitive enough to show variations caused by meteorology alone. The discussion implies that the 1-hour, 3-hour, 8-hour, and 24-hour averages should be sensitive to weather changes.

The document further states, "Except in the case of specific point sources, where daily changes in emissions can affect air quality in a substantial manner, the general uniformity in daily emissions over most urban areas dictates that short-term changes of measured concentrations are caused by meteorological fluctuations." Further, "The longer the period of analysis (i.e. averaging period), the greater the potential for pollutant variances to be complicated by both meteorological and emission factors." The short-term averaging period is defined by USEPA as a 24-hour average or less.[39] The following procedure was used to select one worst-case year for each pollutant:

A sensitivity analysis was conducted for each pollutant using a short-term averaging period established by the NAAQS. The analysis for $NO_x$ emissions, however, applied an annual average, pursuant to the NAAQS. The 2006 Existing Conditions case was run in EDMS using 145 receptors. Refer to Section 8.4, *Dispersion Receptors*. Data for the five receptors showing the highest concentrations for each pollutant for each

[37] Letter from Ms. Katherine S. Jones, FAA Community Planner, to Ms. Sherry Kamke, Environmental Scientist, USEPA Region 5, dated October 17, 2006, with attached minutes summarizing the teleconference held October 2, 2006.

[38] M.D. Zeldin and W.S. Meisel *Use of Meteorological Data in Air Quality Trend Analysis* USEPA, EPA-450/3-78-024, May 1978 USEPA Project Manager Neil H. Frank Office of Air Quality Planning and Standards.

[39] U.S. Environmental Protection Agency, ISC3 User's Guide page 3-9, EPA-454/B-95-003a.

year was extracted from the output files and summarized in a spreadsheet. The analysis showed that the highest concentration would occur at a receptor located at the arrival curb. This was true for all five pollutants for each of the five years. For all the pollutants except CO, the highest concentrations occurred in one unique year. For instance, the highest concentrations of $NO_x$ occurred in 2003, meaning the highest five values all occurred in 2003. For $SO_x$, application of 2005 weather data resulted in higher concentrations than any of the other four years in the analysis. Results of the sensitivity analysis for particulate matter showed that weather unique to 2002 resulted in the highest concentration values for all five years. This was true for both $PM_{10}$ and $PM_{2.5}$. As such, all the future baseline and project alternatives were run for each pollutant using the weather file corresponding to the results of the sensitivity analysis, as given in **Table 6, *Worst-Case Meteorological Data for Dispersion Analysis***.

**TABLE 6**
**WORST-CASE METEOROLOGICAL DATA FOR DISPERSION ANALYSIS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| POLLUTANT | AVERAGING PERIOD | YEAR |
|---|---|---|
| CO | 1-Hour and 8-Hour | 2001 |
| $NO_X$ | Annual | 2003 |
| $SO_X$ | 3-Hour, 24-Hour, and Annual | 2005 |
| $PM_{10}$ | 24-Hour | 2002 |
| $PM_{2.5}$ | 24-Hour and Annual | 2002 |

Source: Landrum and Brown analysis, 2007.

## 6.0 BACKGROUND CONCENTRATIONS

A map of the location of the five monitoring sites that recorded data for the development of the background concentrations in Franklin County is presented in **Exhibit E-1**, ***Central Ohio Air Quality Monitoring Sites***. The background concentrations in Franklin County, which were provided to FAA by MORPC,[40] are summarized in **Table 7, *Franklin County Background Concentrations***. The associated NAAQS are provided for comparison.

The background concentrations of $PM_{2.5}$ already exceed the NAAQS. The $PM_{2.5}$ background concentrations cause this area to be in violation of the average 24-hour and average annual $PM_{2.5}$ standards regardless of any emissions at the airport.

[40] Background concentration data were provided to Landrum & Brown, via an e-mail transmission from Ms. Sarah Hedlund, Ohio EPA, during May 2007.

**TABLE 7**
**FRANKLIN COUNTY BACKGROUND CONCENTRATIONS**

| CRITERIA POLLUTANT | AVERAGING PEROD | NAAQS Standards (μg/m³) | BACKGROUND CONCENTRATION (μg/m³) |
|---|---|---|---|
| CO | 1-Hour | 40,000 | 4,796.40 |
| | 8-Hour | 10,000 | 2,284 |
| $NO_X$ | Annual | 100 | 39 |
| $PM_{10}$ | 24-Hour | 150 | 85 |
| $PM_{2.5}$ | 24-Hour | 35 | 52.1 |
| | Annual | 15 | 16.67 |
| $SO_X$ | 3-Hour | 1,300 | 138.86 |
| | 24-Hour | 365 | 73.36 |
| | Annual | 80 | 10.74 |

Source: MORPC, May 2007.
40 CFR Part 50.

# 7.0. EMISSION SOURCES

An emission inventory was prepared for each of the scenarios listed under Section 1.0, *Introduction and Proposed Project*. Several types of emission sources were evaluated for the emission inventory; the same sources used in the inventory were analyzed through dispersion analysis. The sources include:

- Aircraft;
- APUs;
- GSE;
- Motor vehicles in parking lots and parking garages;
- Motor vehicles on airport access roadways; and
- Stationary sources, including fuel tank storage, deicing, emergency generators, boilers, and an incinerator.

## 7.1 AIRCRAFT, APUS, GSE, AND TAXI/DELAY TIME

Aircraft emissions depend partly on the physical characteristics and performance parameters of each unique aircraft type. These include the airframe type, the type and number of engines, takeoff weight, and approach angle.

In addition to the physical characteristics of the aircraft operating at the airport, emissions further depend on the time that each aircraft type operates in the various modes that define a landing and takeoff cycle. A landing and takeoff cycle (LTO) consists of the approach, landing roll, taxi to and from the gate area, idle time, takeoff, and climbout, as illustrated in **Figure 5**, ***Aircraft Landing and Takeoff Cycle (LTO)***.

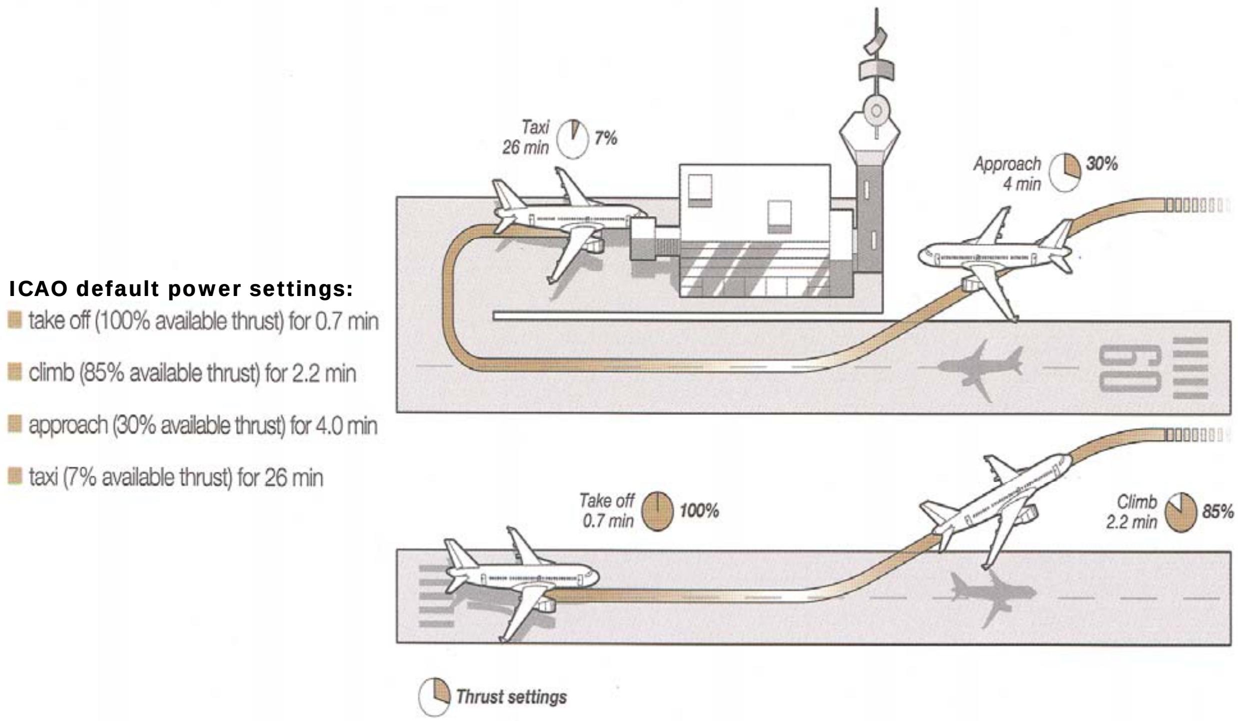


**FIGURE 5 Aircraft Landing and Takeoff Cycle (LTO)**

Source: Airbus, 2004.

The time an aircraft operates in each mode depends on the aircraft type, the mixing height, the airfield configuration, and the number of annual operations.

- Approach begins as the aircraft descends along the approach path, usually at an angle three degrees above the horizon; continuing to a point above ground level known as the mixing height. Approach mode lasts for approximately three to four minutes, depending on the aircraft type, until touchdown on the runway end.
- For dispersion calculations, only emissions below 1,000 feet above ground level (AGL) during approach are included.
- Landing roll begins at touchdown and continues until the aircraft exits the runway onto the taxiway, usually just a few seconds.

The aircraft fleet was based on the fleet evaluated for the noise analysis except when airframe and aircraft engine substitutions were necessary to match the aircraft available in the EDMS database. The fleet of aircraft utilizing the airport consists of air carrier passenger jets, commuter jets, cargo jets and turboprops, air taxi jets and turboprops, and small general aviation jets, turboprops, and piston-powered aircraft. The aircraft and engine types that were used for analysis are given in **Attachment 3, EDMS Input and Output Files by Alternative**.

### *APUs*

The larger jet aircraft use an APU to run heat, air conditioning, and electric for the aircraft at the gate. The APU is also used to restart the engines before departing from the gate area. The assignments of APUs were made using the EDMS default assignments.

### *GSE*

Ground support equipment were assigned based on the on-site survey completed in July 2006[41], and is based on aircraft type. The summary report from the on-site survey is found in **Attachment 5, *On-site GSE Survey Summary and Stationary Source Survey Summary.*** The results of the survey are given in **Table 8, *On-Site Survey of Aircraft GSE Assignments***. EDMS default GSE assignments were assumed for general aviation, military, and corporate aviation aircraft.

**TABLE 8**
**ON-SITE SURVEY OF AIRCRAFT GSE ASSIGNMENTS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| GSE TYPE | AIRCRAFT TYPE (minutes of operation per landing/takeoff cycle) | | |
|---|---|---|---|
| | LARGE JETS | SMALLER JETS | TURBOPROPS |
| Diesel Aircraft Tractor | 21 | 9 | 6 |
| Diesel Baggage Tractor | 57 | 12 | 2 |
| Gasoline Baggage Tractor | | 26 | 20 |
| Diesel Belt Loader | 46 | 28 | |
| Gasoline Belt Loader | 22 | 21 | 21 |
| Gasoline Catering Truck | 15 | | |
| Diesel Fuel Truck | 20 | 11 | 10 |
| Electric GPU Hookup (400 Hz) | | | 30 |

Note: GSE is ground support equipment. EDMS default assignments were used for general aviation, military, and corporate aviation GSE.

Source: Gresham, Smith and Partners. Memorandum: Mobile Source Emission Survey Summary Report. July 21, 2006.

[41] Gresham, Smith and Partners. Memorandum: Mobile Source Emission Survey Summary Report. July 21, 2006.

### Aircraft Average Taxi and Queue Delay Time

For the emission inventory, the EDMS computer model requires the combined average aircraft ground taxi and ground delay time. This information was obtained from the *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport (Airfield Planning Report)*.[42] Average taxi times were calculated by using Geographical Information Systems (GIS) to "sketch" generalized taxi routes to and from the runway ends and aircraft parking locations. Eight possible taxi scenarios were created for the 2006 Existing Conditions for travel inbound and outbound to each of the four runway ends and to each of the three gate areas, the commercial aviation gate, the general aviation gate, and the corporate aviation gate. Taxi paths were further defined under the runway development alternatives for 2012 and 2018, including alternative paths that allow for the proposed passenger terminal under the 2018 runway development alternatives, and the 2012 and 2018 Accelerated Sponsor's Proposed Project. The taxi time was calculated assuming an average taxi speed of 16.53 miles per hour, based on the data in the *Airfield Planning Report*. Diagrams of the taxi paths used for calculation of taxi times are given in **Exhibit E-2a-E-2f**, **Exhibit E-3a-E-3f**, and **Exhibit E-4a-E-4h**. Refer to Attachment 1, List of Exhibits.

Average aircraft departure delay time was also based on data provided in the *Airfield Planning Report*. Changes in delay time were based proportionally on the number of aircraft operations in each year, 2012, 2018, and the higher level of operations for the 2012 and 2018 accelerated alternatives. The taxi and departure queue delay times for all alternatives are presented in **Table 9**, ***Average Departure Taxi and Delay Times***.

## 7.2 MOTOR VEHICLES IN PARKING LOTS AND GARAGES

Data relating to motor vehicles utilizing the airport's parking lots and garages were obtained from the following sources:

- *International Gateway Realignment, Categorical Exclusion Reevaluation Level 4*, prepared for the Ohio Department of Transportation, District 6, dated August 2006.
- T*raffic Impact Study: 17th Avenue Parking Lot*, prepared for the CRAA, preliminary report dated October 19, 2006.
- *Traffic Impact Study: New Employee Parking Lot*, prepared for the CRAA, preliminary report dated October 19, 2006.
- *Rental Car Update & Analysis*, prepared for the CRAA, dated February 2005.
- On-site survey of vehicles accessing the arrival and departure curbs, conducted by CRAA on July 25, 2007.

[42] CRAA, *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*, February 14, 2006.

## TABLE 9
## AVERAGE AIRCRAFT TAXI AND DEPARTURE DELAY TIMES
## PORT COLUMBUS INTERNATIONAL AIRPORT

| Existing Conditions / Project Alternative | Average Unimpeded Taxi-in Time | Average Unimpeded Taxi-out Time | Average Ground & Queue Departure Delay | Total Average Taxi & Delay Time | Delay by Runway End | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 10L | 10R/X [1] | 28L/X [1] | 28R |
| | (in minutes) | | | | | | | |
| 2006 Existing Conditions | 4.07 | 4.52 | 1.19 | 9.78 | 0.53 | 0.63 | 1.83 | 1.78 |
| 2009 Inventory for SIP Attainment Year | | | | 9.85[2] | | | | |
| 2010 Inventory for SIP Milestone Year | | | | 9.92[2] | | | | |
| 2012 Alternative A: No Action | 4.04 | 4.48 | 1.46 | 9.98 | 0.84 | 0.56 | 2.52 | 1.91 |
| 2012 Alternative C2a | 4.36 | 4.55 | 1.34 | 10.25 | 0.62 | 0.67 | 2.16 | 1.91 |
| 2012 Alternative C2b | 4.25 | 4.76 | 1.34 | 10.35 | 0.79 | 0.86 | 1.98 | 1.74 |
| 2012 Alternative C3a | 4.33 | 4.51 | 1.34 | 10.19 | 0.62 | 0.67 | 2.16 | 1.91 |
| 2012 Alternative C3b | 4.22 | 4.73 | 1.34 | 10.29 | 0.79 | 0.86 | 1.98 | 1.74 |
| 2012 Accelerated Alternative A: No Action | 3.96 | 4.45 | 8.42 | 16.82 | 4.63 | 3.67 | 13.61 | 11.75 |
| 2012 Accelerated Sponsor's Proposed Project | 4.18 | 4.70 | 5.45 | 14.33 | 2.99 | 3.82 | 7.47 | 7.51 |
| 2018 Alternative A: No Action | 4.02 | 4.48 | 1.64 | 10.14 | 1.00 | 0.60 | 2.87 | 2.08 |
| 2018 Alternative C2a | 4.18 | 4.87 | 1.51 | 10.55 | 0.53 | 1.18 | 1.76 | 2.54 |
| 2018 Alternative C2b | 4.09 | 5.03 | 1.51 | 10.62 | 0.67 | 1.39 | 1.61 | 2.35 |
| 2018 Alternative C3a | 4.14 | 4.82 | 1.51 | 10.47 | 0.53 | 1.18 | 1.76 | 2.54 |
| 2018 Alternative C3b | 4.05 | 4.99 | 1.51 | 10.54 | 0.67 | 1.39 | 1.61 | 2.35 |
| 2018 Accelerated Sponsor's Proposed Project | 4.01 | 4.98 | 6.39 | 15.39 | 2.53 | 6.34 | 6.12 | 10.57 |

Notes: 2012 and 2018 Alternative A: No Action alternatives include use of the crossover taxiway. Taxi-in time increases while taxi-out time decreases with the implementation of the Noise Compatibility Program (NCP) for 2012 and 2018 alternatives due to the increase in east flow. The 2018 runway development alternatives, and the 2012 and 2018 accelerated alternatives for runway development, include operations at a proposed midfield terminal. Weighted taxi time decreases with the 2012 Accelerated Sponsor's Proposed Project because more operations are operating at the proposed terminal and have shorter taxi paths as compared to the GA and corporate gates. Taxi-in paths are shorter as compared to taxi-out paths because the aircraft stop short and exit before the end of the runway.

1 10R/X and 28L/X indicate either the existing Runway 10R/28L or the proposed relocated Runway 10X/28X.

2 Data was interpolated for 2009 and 2010 using the Existing (2006) data and the 2012 Alternative A; No Action.

Sources: *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*, Tables 2-11 & 2-12, February 14, 2006. Landrum & Brown, analysis, 2007.

Diagrams of the parking lots and garages that were considered for analysis are presented on the following exhibits:

- **Exhibit E-5, *2006 Parking Lots and Garages for 2006 Existing Conditions***,
- **Exhibit E-6, *Parking Lots and Garages for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 Accelerated Alternative A: No Action***, and
- **Exhibit E-7, *Parking Lots and Garages for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project*.**

The analysis performed to determine the distance traveled from motor vehicle in parking lots and garages was prepared using the Microsoft EXCEL® spreadsheet program and considered the hourly number of motor vehicles per lot, average speed, and aviation activity forecasts, assuming the number of cars on the airport would be directly related to the number of origination and destination passengers.[43] The motor vehicle distance traveled in feet for each of the parking lots and garages are given in **Attachment 3, EDMS Input and Output Files by Alternative**.

## 7.3 MOTOR VEHICLES ON ROADWAYS

Data relating to motor vehicles traversing the airport's access roadways were obtained from the same sources used for parking lots and garages. Diagrams of the airport's access roadways that were considered for analysis under all the alternatives are presented in the following exhibits, which also include the traffic counts:

- **Exhibit E-8a-E-8b**
- **Exhibit E-9a-E-9e**
- **Exhibit E-10a-E-10d**

Roadway names, the length in round-trip miles, number of vehicles per hour, and the speed in miles per hour considered for analysis are given in **Attachment 3, EDMS Input and Output Files by Alternative**.

## 7.4 MOTOR VEHICLES EMISSION FACTORS

Emission factors were determined though use of the USEPA mobile source emission program, MOBILE6.2. The MOBILE6.2 input and output files, along with the reference files required to run the emission factor calculations for Franklin County, were provided to the FAA by MORPC.[44] The emissions factors determined by MOBILE6.2 are dependent upon input data including vehicle type, age, miles

[43] Origination and destination passengers (O&D) would be those passengers that begin or end their journey at CMH and are not at the terminal solely to transfer to another flight, referred to as transfer passengers. O&D passengers leave the terminal and travel either to the parking areas, to the rental car area, or are transported by taxi or other forms of transportation.

[44] MOBILE6.2 files were provided to Landrum & Brown, via an e-mail transmission from MORPC, on April 9, 2007.

traveled, vehicle speed, and percent of hot and cold starts. Operating characteristics such as ambient temperature also influence the calculations of the emissions factors. Emission factors are given in **Attachment 7, MOBILE 6.2 Input and Output Files.**

## 7.5 STATIONARY SOURCES

Stationary sources of emissions were identified based on an on-site survey completed in July 2006. The summary report from the on-site survey is found in **Attachment 5, *On-Site GSE Survey Summary and Stationary Source Survey Summary.***

The sources identified in the survey included boilers, storage tanks, and incinerators and are presented in **Table 10, *On-Site Survey of Stationary Sources***. The location of the stationary sources inventoried in the survey are presented in the following exhibits:

- **Exhibit E-11, *Stationary Sources for 2006 Existing Conditions*,**
- **Exhibit E-12, *Stationary Sources for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 Accelerated Alternative A: No Action*,** and
- **Exhibit E-13, *Stationary Sources for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project*.**

Operational parameters of some of the stationary sources of emissions identified for 2006 Existing Conditions, such as generators and incinerators, were assumed to remain the same through 2012 and 2018 for all alternatives, although the position of the sources could change with the runway development alternatives. Emissions from fuel tanks would vary proportionally with the number of aircraft operations in 2012, 2018, and under the 2012 and 2018 accelerated alternatives. Also, the status of the Nationwide fuel farm identified by Map ID #51 would change in 2012 and 2018. This stationary source was not part of the 2006 Existing Conditions but was included in all future baselines (2012 and 2018) and all other 2012 and 2018 runway development alternatives. The heating units required for the proposed terminal building would be included in the 2018 runway development alternatives and in the 2012 and 2018 Accelerated Sponsor's Proposed Project.

## TABLE 10
## ON-SITE SURVEY OF STATIONARY SOURCES
## PORT COLUMBUS INTERNATIONAL AIRPORT

| Map ID | Stationary Source | Type |
|---|---|---|
| 1 | Concourse A | Emergency Generator W/ Diesel Fuel Tank |
| 2 | Concourse B Diesel | Emergency Generator W/ Diesel Fuel Tank |
| 3 | Concourse B Natural Gas | Natural Gas Boiler |
| 4 | Concourse C | Emergency Generator W/ Diesel Fuel Tank |
| 5 | PEA | Natural Gas Boiler |
| 6 | Lane Corridor A | Natural Gas Boiler |
| 7 | Lane Hangar 3 | Natural Gas Boiler |
| 8 | Lane Hangar 4 | Natural Gas Boiler |
| 9 | Lane Hangar 5 | Natural Gas Boiler |
| 10 | Backup IT | Emergency Generator W/ Diesel Fuel Tank |
| 11 | Backup Concourse A | Natural Gas Boiler |
| 12 | Backup Concourse C | Emergency Generator W/ Diesel Fuel Tank |
| 13 | Misc. Concourse B | Emergency Generator W/ Diesel Fuel Tank |
| 14 | Backup Garage | Emergency Generator W/ Diesel Fuel Tank |
| 15 | Backup ARFF | Emergency Generator W/ Diesel Fuel Tank |
| 16 | Aircraft Deice PG TI | Deice Area |
| 17 | Aircraft Deice EG | Deice Area |
| 18 | Airfield Maintenance Gas | Gasoline Storage Tank |
| 19 | Airfield Maintenance Diesel | Diesel Fuel Storage Tank |
| 20 | Lane – Jet A | Jet A Storage Tanks |
| 21 | Lane Diesel | Diesel Fuel Storage Tank |
| 22 | Lane Gasoline | Gasoline Storage Tank |
| 23 | Incinerator | Incinerator |
| 24 | Air Deice PG TIV | Deice Area |
| 25 | Lane 100LL | Avgas Storage Tanks |
| 26 | Runway Deice KOAC | Deice Area |
| 27 | Million Air Jet A | Jet A Storage Tanks |
| 28 | Million Air Diesel | Diesel Fuel Storage Tank |
| 29 | Million Air Av Gas | AvGas Storage Tank |
| 30 | 45 Hotel Jet A | Jet A Storage Tanks |
| 31 | Alamo Gasoline (not in use) | Gasoline Storage Tank |
| 32 | Dollar Gasoline | Gasoline Storage Tank |
| 33 | Englefield Gasoline | Gasoline Storage Tank |
| 34 | Englefield Gasoline | Gasoline Storage Tank |
| 35 | Englefield Gasoline | Gasoline Storage Tank |
| 36 | Englefield Diesel | Diesel Fuel Storage Tank |
| 37 | Englefield Kerosene | Kerosene Storage Tank |
| 38 | FAA Control Tower | Emergency Generator W/ Diesel Fuel Tank |
| 39 | Hertz Gasoline | Gasoline Storage Tank |
| 40 | NetJets Diesel | Emergency Generator W/ Diesel Fuel Tank |
| 41 | Quick Turnaround Gasoline | Gasoline Storage Tanks |
| 42 | Avis Gasoline | Gasoline Storage Tank |
| 43 | National Gasoline | Gasoline Storage Tank |
| 44 | FAA ASR-9 | Emergency Generator W/ Diesel Fuel Tank |
| 45 | Flight Safety | Emergency Generator W/ Diesel Fuel Tank |
| 46 | Lift Station | Emergency Generator W/ Diesel Fuel Tank |
| 47 | Electrical Vault | Emergency Generator W/ Diesel Fuel Tank |
| 48 | NetJets | Emergency Generator W/ Diesel Fuel Tank |
| 49 | Nationwide | Fuel Farm and Emergency Generator W/ Diesel Fuel Tank |
| 50 | North Fuel Farm | Jet A Storage Tanks |
| 51 | Nationwide | Fuel Farm |
| 52 | Heating Unit | Natural Gas Boiler (proposed midfield terminal) |

Source: Gresham, Smith and Partners. Memorandum: Stationary Source Emission Survey Summary Report. dated July 21, 2006.

### 7.6 CONSTRUCTION EQUIPMENT

Construction is expected to begin in 2009; the first year of full operation of the CMH Sponsor's Proposed Project would be 2012. The year of greatest emissions is expected to be 2012. Locations of possible construction impacts are shown on the following exhibits:

- **Exhibit E-14a, Construction Impacts for All 2012 and 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project;**
- **Exhibit E-14b, *Additional Construction Impacts for 2012 and 2018 Runway Development Alternatives (C2a and C2b*);** and
- **Exhibit E-14c, *Additional Construction Impacts for 2012 and 2018 Runway Development Alternatives (C3a and C3b).***

The calculations for the emissions from construction relating to the projects shown in the exhibits listed above are provided in **Attachment 6**, ***Construction Emissions Inventory Tables***. The construction equipment emissions for Alternatives C2a, C2b, C3a, and C3b for 2012 and 2018 are presented in Chapter Five, Section 5.5 *Air Quality*. Construction emissions for the "C2" alternatives, C2a and C2b, are the same; likewise, construction emissions for the "C3" alternatives are the same for a given analysis year, 2012 or 2018. This is because the only difference between the C2 and the C3 alternatives in a given analysis year is the use of the noise program, which has no need for construction.

## 8.0 DISPERSION MODELING VARIABLES

Several modeling input variables are necessary for the dispersion analysis. In addition to the input data for the emission inventory, operational profiles are required; the assignment of gates is necessary; taxiway and runway assignments are needed; and dispersion receptors are placed.

### 8.1 OPERATIONAL PROFILES

A statistical description of runway use at the airport is required in dispersion calculations to distribute aircraft operations, and ultimately aircraft emissions, across the airfield throughout the year. Operational profiles were derived from the Airports Noise and Operations Management System (ANOMS) data for the period from April 1, 2005 through March 31, 2006. The three sets of operational profiles are presented in **Table 11**, ***Operational Profiles.*** The operational profiles for the runway queue time and queue length would be the same as the profiles used for the aircraft.

**TABLE 11**
**OPERATIONAL PROFILES**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| Hour | Percent |
|---|---|
| 0 | 14.7% |
| 1 | 6.1% |
| 2 | 5.3% |
| 3 | 6.2% |
| 4 | 7.8% |
| 5 | 20.0% |
| 6 | 57.3% |
| 7 | 55.1% |
| 8 | 64.3% |
| 9 | 84.0% |
| 10 | 79.3% |
| 11 | 80.4% |
| 12 | 79.8% |
| 13 | 77.1% |
| 14 | 82.0% |
| 15 | 75.4% |
| 16 | 97.8% |
| 17 | 100.0% |
| 18 | 84.9% |
| 19 | 65.1% |
| 20 | 58.2% |
| 21 | 55.5% |
| 22 | 53.2% |
| 23 | 40.3% |

| Weekday | Percent |
|---|---|
| Sunday | 82.0% |
| Monday | 92.0% |
| Tuesday | 95.0% |
| Wednesday | 98.0% |
| Thursday | 100.0% |
| Friday | 95.0% |
| Saturday | 67.0% |

| Month | Percent |
|---|---|
| January | 90.0% |
| February | 75.0% |
| March | 80.0% |
| April | 100.0% |
| May | 98.0% |
| June | 90.0% |
| July | 90.0% |
| August | 90.0% |
| September | 87.0% |
| October | 88.0% |
| November | 84.0% |
| December | 66.0% |

Source: CRAA Aircraft Noise and Operations Management System (ANOMS) for CMH, April 1, 2005 through March 31, 2006.

## 8.2 GATE AREAS

Aircraft for each of the scenarios were assigned to a gate area, grouped by runway end, and included the taxi path to and from the runway end. Three general gate areas were identified, the Commercial Aviation, General Aviation, and Corporate Aviation. The gate areas are shown on the following exhibits:

- **Exhibit E-15, *Location of Generalized Aircraft Gate Areas for Computer Modeling for 2006 Existing Conditions, 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and for 2012 and 2018 Accelerated Alternative A: No Action,* and**
- **Exhibit E-16, *Location of Generalized Aircraft Gate Areas for Computer Modeling for 2012 and 2018 Runway Development Alternatives, and for 2012 and 2018 Accelerated Sponsor's Proposed Project.***

## 8.3 TAXIWAY AND RUNWAY ASSIGNMENTS

For dispersion, runway assignments were determined as given in the noise analysis. Taxi paths were assigned the same as given for the taxiway analysis described in Section 7.1, *Aircraft, APUs, GSE, and Taxi/Delay Time.*

## 8.4 DISPERSION RECEPTORS

There were 145 receptors assigned for dispersion modeling for the 2006 existing conditions as shown on:

- **Exhibit E-17, *Fenceline and Community Grid Receptors for 2006 Existing Conditions,* and**
- **Exhibit E-18, *Terminal Area Dispersion Receptor Locations for 2006 Existing Conditions***.

The first array of receptors are located every ten degrees around the airport property line perimeter, beginning at 360 degrees, as measured from the airport reference point. Another ring of receptors were located outward 1,500 feet along the same vectors, and a third ring of receptors were located 1,500 feet further out from the property line, also along the same vectors. Additional receptors were placed in the parking areas along International Gateway Drive and at the parking garage adjacent to the terminal.

The first version of the 2006 Existing Conditions analysis was dated July 14, 2007 (the 071407 sensitivity run), and included all weather years (5 years) and all receptors (145 receptors). The 071407 sensitivity run showed the higher concentrations would all occur in the "terminal core," defined as including the arrival and departure curbs, the parking garage adjacent to the terminal building, and along International Gateway. Based on the 071407 run, the locations of the terminal area receptors were revised as shown on:

- **Exhibit E-19, *Terminal Area Dispersion Receptor Locations for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and for 2012 and 2018 Accelerated Alternative A: No Action*, and**
- **Exhibit E-20, *2018 Terminal Area Dispersion Receptor Locations for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project.***

These receptors more accurately capture the concentrations at the terminal curbs and the garage, as well as International Gateway. In addition, updated information was provided by CRAA that increased the traffic count on all the terminal-area roadways. Another dispersion sensitivity analysis was calculated on August 6, 2007 (the 080607 run). The results were then coordinated with FAA, CRAA, and OEPA as demonstrated in **Attachment 2**, **Air Quality Scoping Meeting Materials** and were used to suggest the likely location of the highest concentration, and to determine the most representative locations for sensitive community receptors.

The analysis applied 65 receptor locations including the entire perimeter boundary (36 receptors), the receptors in the terminal core, and several community receptors. The 10 receptor locations determined to be representative of the impacts under the project alternatives are shown in the following exhibit:

**Exhibit E-21, *Airport Fenceline and Community Sensitive Receptor Locations for All Years, All Alternatives***. The list of the 10 receptors for which results were extracted and reported in Chapter 5, Environmental Consequences are presented in **Table 12**, ***Airport and Community Sensitive Receptor Locations for All Years, All Alternatives.***

## Table 12
## AIRPORT AND COMMUNITY SENSITIVE RECEPTOR LOCATIONS
## PORT COLUMBUS INTERNATIONAL AIRPORT

| RECEPTOR NAME | RECEPTOR LOCATION AND PROXIMITY TO SENSITIVE STRUCTURES | RECEPTOR IDENTIFICATION ON EXHIBIT E-21 AND IN MODELING OUTPUT[1] |
|---|---|---|
| Arrival Curb | Located at the existing terminal building on the east side of the roadway situated in front of the passenger-pickup area from which arriving passengers are transported to parking areas, rental car facilities, or other destinations off-airport. Pollutant concentrations would be expected to be highest at this receptor due to the close proximity to both motor vehicles and GSE at the terminal gate area. | Arr Curb |
| Gahanna East | Located northeast of the airport near Friendship Park, and near Wonderland Community Church, Shepherd Church of the Nazarene and Christian School, and Christian Center Church. | 60 |
| Gahanna North | Located north of the airport near Denison Avenue and Goshen Lane; near Victory in Pentecost Church and Goshen Lane Elementary School. | 120 (G-1) |
| Mifflin South | Located southwest of the airport near Krumm Park; near Living Word Church, East Columbus Elementary School, Corinthian Baptist Church, and East Mount Olivet Baptist Church. | 118 (MIF-2) |
| Whitehall | Located south of the airport near Yearling Road; near Holy Spirit School and Whitehall Library. | 123 (W-1) |
| Gahanna West | Located north of the airport, near Hermitage Road; near Victory in Pentecost Church and Goshen Lane Elementary School. | 53 |
| Airport South | Located south of the airport; selected to capture potential impacts in public access areas south of the proposed replacement runway. | 32 |
| Airport Northwest | Located northwest of the airport; selected to capture potential impacts in a public access area from pollutants evaluated as a three-hour average concentration. | 11 |
| Mifflin North | Located northwest of the airport; selected to capture potential impacts in public access areas due to the one-hour average concentration of pollutants. | 119 (MIF-1) |
| Golf Course | Located east of the airport in the public golf course near Runway 28L. | Golf Course |

Note: GSE are ground support equipment.

[1] The receptor name is given as it appears on Exhibit E-21. The computer modeling output files may have a different identification name for some receptors, where the different identification is given in parenthesis.

Source: OEPA, 2007.
Landrum & Brown, 2007.

# ATTACHMENT 1

# EXHIBITS

All of the exhibits referred to in this Draft Technical Report are contained in this attachment.

**EXHIBIT E-1** Central Ohio Air Quality Monitoring Sites

**EXHIBIT E-2a** Generalized Arrival Taxi Paths to Terminal Gate for 2006 Existing Conditions

**EXHIBIT E-2b** Generalized Arrival Taxi Paths to General Aviation Gate for 2006 Existing Conditions

**EXHIBIT E-2c** Generalized Arrival Taxi Paths to Corporate Gate for 2006 Existing Conditions

**EXHIBIT E-2d** Generalized Departure Taxi Paths from Terminal Gate for 2006 Existing Conditions

**EXHIBIT E-2e** Generalized Departure Taxi Paths from General Aviation Gate for 2006 Existing Conditions

**EXHIBIT E-2f** Generalized Departure Taxi Paths from Corporate Gate for 2006 Existing Conditions

**EXHIBIT E-3a** Generalized Arrival Taxi Paths to Terminal Gate for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 and 2018 Accelerated Alternative A: No Action

**EXHIBIT E-3b** Generalized Arrival Taxi Paths to General Aviation Gate for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 and 2018 Accelerated Alternative A: No Action

**EXHIBIT E-3c** Generalized Arrival Taxi Paths to Corporate Gate for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 and 2018 Accelerated Alternative A: No Action

**EXHIBIT E-3d** Generalized Departure Taxi Paths from Terminal Gate for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 and 2018 Accelerated Alternative A: No Action

# EXHIBITS, *Continued*

**EXHIBIT E-3e** Generalized Departure Taxi Paths from General Aviation Gate for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 and 2018 Accelerated Alternative A: No Action

**EXHIBIT E-3f** Generalized Departure Taxi Paths from Corporate Gate for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 and 2018 Accelerated Alternative A: No Action

**EXHIBIT E-4a** Generalized Arrival Taxi Paths to Existing Terminal Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-4b** Generalized Arrival Taxi Paths to Proposed Midfield Terminal Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-4c** Generalized Arrival Taxi Paths to General Aviation Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-4d** Generalized Arrival Taxi Paths to Corporate Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-4e** Generalized Departure Taxi Paths from Existing Terminal Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-4f** Generalized Departure Taxi Paths from Proposed Midfield Terminal Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-4g** Generalized Departure Taxi Paths from General Aviation Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-4h** Generalized Departure Taxi Paths from Corporate Gate for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-5** Parking Lots and Garages for 2006 Existing Conditions

# EXHIBITS, *Continued*

**EXHIBIT E-6** Parking Lots and Garages for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 Accelerated Alternative A: No Action

**EXHIBIT E-7** Parking Lots and Garages for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-8a** Roadways for 2006 Existing Conditions

**EXHIBIT E-8b** Roadway Traffic Counts for 2006 Existing Conditions

**EXHIBIT E-9a** Generalized Roadway Segments for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 Accelerated Alternative A: No Action

**EXHIBIT E-9b** Roadway Traffic Counts for 2012 Alternative A: No Action

**EXHIBIT E-9c** Roadway Traffic Counts for 2012 Runway Development Alternatives

**EXHIBIT E-9d** Roadway Traffic Counts for 2012 Accelerated Sponsor's Proposed Project

**EXHIBIT E-9e** Roadway Traffic Counts for 2018 Alternative A: No Action

**EXHIBIT E-10a** Generalized Roadway Segments for 2018 Runway Development Alternatives and Accelerated Sponsor's Proposed Project for 2012 and 2018

**EXHIBIT E-10b** Roadway Traffic Counts for 2018 Runway Development Alternatives.........................................................................

**EXHIBIT E-10c** Roadway Traffic Counts for 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-10d** Roadway Traffic Counts for 2012 Accelerated Sponsor's Proposed Project

**EXHIBIT E-11** Stationary Sources for 2006 Existing Conditions

**EXHIBIT E-12** Stationary Sources for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and 2012 Accelerated Alternative A: No Action

# EXHIBITS, *Continued*

**EXHIBIT E-13** Stationary Sources for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-14a** Construction Impacts for All 2012 and 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-14b** Additional Construction Impacts for 2012 and 2018 Runway Development Alternatives (C2a and C2b)

**EXHIBIT E-14c** Additional Construction Impacts for 2012 and 2018 Runway Development Alternatives (C3a and C3b)

**EXHIBIT E-15** Location of Generalized Aircraft Gate Areas for Computer Modeling for 2006 Existing Conditions, 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and for 2012 and 2018 Accelerated Alternative A: No Action

**EXHIBIT E-16** Location of Generalized Aircraft Gate Areas for Computer Modeling for 2012 and 2018 Runway Development Alternatives, and for 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-17** Fenceline and Community Grid Receptors for 2006 Existing Conditions

**EXHIBIT E-18** Terminal Area Dispersion Receptor Locations for 2006 Existing Conditions

**EXHIBIT E-19** Terminal Area Dispersion Receptor Locations for 2012 and 2018 Alternative A: No Action and 2012 Runway Development Alternatives, and for 2012 and 2018 Accelerated Alternative A: No Action

**EXHIBIT E-20** Terminal Area Dispersion Receptor Locations for 2018 Runway Development Alternatives, and 2012 and 2018 Accelerated Sponsor's Proposed Project

**EXHIBIT E-21** Airport Fenceline and Community Sensitive Receptor Locations for All Years, All Alternatives

# ATTACHMENT 2
# AIR QUALITY SCOPING MEETING MATERIALS

The air quality scoping process is designed to make the air quality assessment process more efficient by encouraging participation in early coordination with the Federal, State, and local air quality agencies, and other relevant agencies concerned with the thorough assessment of air quality impacts at the Airport. This attachment includes copies of agendas, meeting minutes, and handout materials distributed for the agency coordination meetings conducted with the Federal, State, and local agencies.

# AIR QUALITY SCOPING MEETING
## July 19, 2006
## Columbus, Ohio

**Invitation**
**Pre Meeting Mailing**
**Agenda**
**Registration**
**Presentation**
**Post Meeting Mailing and Meeting Minutes**
**Comments**

-----Original Message-----
From: Katherine.S.Jones@faa.gov [mailto:Katherine.S.Jones@faa.gov]
Sent: Monday, July 10, 2006 12:37 PM
To: Kamke.Sherry@epamail.epa.gov; Morris.Patricia@epamail.epa.gov; Leslie.Michael@epamail.epa.gov; King.Suzanne@epamail.epa.gov; bill.spires@epa.state.oh.us; sam.macdonald@epa.state.oh.us; sarah.hedlund@epa.state.oh.us; isaac.robinson@epa.state.oh.us; lkoprowski@morpc.org; randy.sanders@dnr.state.oh.us; valerie.croasmun@dot.state.oh.us; thom.slack@dot.state.oh.us; Rob Adams; dwall@columbusairports.com; Irene.Porter@faa.gov; Chris Babb
Subject:

All:

The Federal Aviation Administration (FAA) is preparing an Environmental Impact Statement (EIS) to review the potential impacts from proposed capital improvements for the Port Columbus International Airport (CMH). The Columbus Regional Airport Authority (CRAA) proposes to replace Runway 10R/28L with a new runway of approximately the same length, relocating the new runway south of the existing runway to allow for passenger terminal expansion that will accommodate future aviation demand at the airport.

The FAA is planning a scoping meeting that will focus on the air quality assessment for the EIS. Discussion during the meeting will include the methodology for preparing an air quality analysis required by the National Environmental Policy Act (NEPA) and procedures required under the Clean Air Act (CAA) regulations. The FAA is requesting your attendance because of your unique expertise concerning the evaluation of air quality impacts and/or air quality assessments at airports. The details of the meeting are as follows:

Date: Wednesday, July 19, 2006

Time: 9:00 a.m. to 12:00 noon EDT

Place: Ohio EPA Central Office
Contact: Bill Spires
122 South Front Street
6th Floor DERR Conference Room
Columbus, Ohio 43207

Ginny Raps from Landrum & Brown, the consultant hired to perform this task will be sending out discussion material via e-mail by Wednesday July 12, 2006 for your review in advance so that we can make the best use of our time together.

Please respond to this e-mail to confirm or decline this invitation. This will help us when making arrangements for the facilities we will need for the meeting.

If you have any questions, please give me a call at any time.

Thanks you,
Katherine Jones
734-229-2958

(See attached file: CMH AQ Scoping Agenda July 19 2006 FINAL.doc)

# PORT COLUMBUS INTERNATIONAL AIRPORT ENVIRONMENTAL IMPACT STATEMENT

## Federal Aviation Administration

## AIR QUALITY SCOPING MEETING

**Wednesday July 19, 2006**
**9:00 a.m. to 12:00 noon**

**Ohio EPA Central Office**
**122 South Front Street**
**Columbus, OH 43216**

## AGENDA

*Welcome* ........................................ *Katy Jones, Federal Aviation Administration*

*I. Introduction* ........................................ *Virginia Raps, Landrum & Brown*

*II. Regulatory Requirements* ........................................ *Discussion*

*III. Modeling Approach* ........................................ *Discussion*

*IV. Data Requirements* ........................................ *Discussion*

*V. Conformity* ........................................ *Discussion*

* * * * *

**AGENCY CONTACT:** Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174
**Email:** CMHEIS@FAA.GOV
**Website:** www.Airportsites.net/CMH-EIS

**From:** Ginny Raps
**Sent:** Thursday, July 13, 2006 7:31 AM
**To:** 'Kamke.Sherry@epamail.epa.gov'; 'Morris.Patricia@epamail.epa.gov'; 'Leslie.Michael@epamail.epa.gov'; 'King.Suzanne@epamail.epa.gov'; 'bill.spires@epa.state.oh.us'; 'sam.macdonald@epa.state.oh.us'; 'sarah.hedlund@epa.state.oh.us'; 'isaac.robinson@epa.state.oh.us'; 'lkoprowski@morpc.org'; 'randy.sanders@dnr.state.oh.us'; 'valerie.croasmun@dot.state.oh.us'; 'thom.slack@dot.state.oh.us'; Rob Adams; 'dwall@columbusairports.com'; 'Irene.Porter@faa.gov'; Chris Babb; Ginny Raps; 'Foster, Jill'; 'Lengel, John'; 'Katherine.S.Jones@faa.gov'
**Subject:** FAA Environmental Impact Statement for Columbus International Airport - Air Quality Scoping meeting, July 19

Attached is the discussion outline for the scoping meeting scheduled for Wednesday, July 19, 2006, at the offices of the Ohio EPA in Columbus, Ohio. The FAA is conducting this meeting to discuss the methodology to assess the air quality impact of the project proposed for the airport by the Columbus Regional Airport Authority (CRAA).

Please reply to this email message indicating your intention to participate in this meeting. Facilities are available to connect to this meeting through teleconferencing, if necessary.

Thank you,
Ginny

**Virginia L. Raps, Project Manager**
***Landrum & Brown, Incorporated***
11279 Cornell Park Drive
Cincinnati, OH 45242
Tel: 513-530-1238
Fax: 513-530-1278
Cell: 937-218-0058
Email: graps@landrum-brown.com
Web: www.landrum-brown.com





**Port Columbus**
**International Airport**
**Environmental Impact Statement**

# Discussion Outline

## Air Quality Scoping Meeting

Location: Ohio Environmental Protection Agency (OEPA)
6th Floor (DERR) Conference Room
122 South Front Street
Columbus, OH 43216

Date: Wednesday, July 19, 2006
Time: 9:00 a.m. – 12:00 noon

**Prepared for:**

Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Romulus, Michigan 48174

**Prepared by:**

Landrum & Brown, Incorporated
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Cincinnati, OH 45242

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# I. INTRODUCTION

The Federal Aviation Administration (FAA) is preparing an Environmental Impact Statement for the Port Columbus International Airport (CMH EIS or airport). As the airport sponsor, the Columbus Regional Airport Authority (CRAA) proposes a Federal action to replace Runway 10R/28L with a new runway of approximately the same length. The new runway is proposed to be relocated south of the existing Runway 10R/28L to allow for passenger terminal expansion that will accommodate future aviation demand at the airport. At this time, the FAA intends to include a review of impacts to all environmental categories in the CMH EIS, including air quality, under the following cases:

- 2006/2007 Existing Conditions
- 2012 Baseline
- 2012 Project alternatives
- 2018 Baseline
- 2018 Project alternatives

The air quality scoping process begins with this meeting and will make the air quality assessment process more efficient by encouraging participation in early coordination with the Federal, State, and local air quality agencies, and other relevant agencies concerned with the thorough assessment of air quality impacts at the airport. The coordination effort will be documented in a *Draft Air Quality Approach Technical Report*, which will be included in the Draft EIS during the public comment period.

The goal of the air quality scoping process is to:

- Obtain concurrence on procedures and methodology prior to the publication of the Draft CMH EIS
- Engage in a data exchange of information necessary to complete the air quality assessment
- Determine the general and transportation conformity requirements under the Clean Air Act, including the 1990 Amendments (CAA)

During this initial air quality scoping meeting a description of airport air quality assessment procedures will be given along with a general discussion of:

- Regulatory requirements
- Modeling approach
- Data requirements

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**Proposed Project**


The airport currently has a set of parallel runways as shown in the photograph to the right. The shorter Runway 10L/28R, located north of the passenger terminal area, is 8,000 feet long. The longer Runway 10R/28L is located south of the terminal core and is 10,125 feet long. At this time, the FAA expects the Proposed Project to include the following elements:

- Replacement of Runway 10R/28L, to a length of 10,133 feet, to be located approximately 700 feet south of the existing Runway 10R/28L
- Construction of additional taxiways to support the replacement runway
- Installation of navigational aids (NAVAIDS)
- Terminal development
- Roadway improvements in the terminal core
- Parking facility improvements
- Development of air traffic operational procedures for the replacement runway
- Proposed Part 150 noise abatement actions to be implemented upon receipt of the Record of Approval.

**Franklin County Air Quality Status**

The airport is located in Franklin County, Ohio, which is included in the USEPA air quality control region defined in the Code of Federal Regulations (CFR) Title 40, Part 81 as the *Metropolitan Columbus Intrastate Air Quality Control Region* (AQCR).[1] The U.S. Environmental Protection Agency (USEPA) has determined that levels of ozone and emissions of fine particulate matter ($PM_{2.5}$) in the AQCR exceed the Federal standards defining healthful air quality while meeting the Federal standards

[1] 40 CFR Part 81, Section 200, *Metropolitan Columbus Intrastate Air Quality Control Region.*





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for emissions of carbon monoxide (CO), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), coarse particulate matter ($PM_{10}$), and lead (Pb).

Because of the air quality status of Franklin County, a proposed Federal action at CMH would require an assessment pursuant to the general conformity provisions of the CAA, which is necessary to ensure compliance to the Ohio State Implementation Plan (SIP).[2] In addition to the CAA, the impacts of the Proposed Project would require assessment under the provisions of the National Environmental Policy Act (NEPA) to determine compliance to the Federal air quality standards, referred to as the National Ambient Air[3] Quality Standards (NAAQS).[4] The analyses required under the CAA and NEPA are separate and distinct. However, the analyses may be combined where overlaps exist, and the results may be reported in a common document.

**Ohio State Implementation Plan**

According to provisions of the CAA, each State must provide the USEPA with a SIP that includes a strategy to improve the air quality in areas that do not meet the NAAQS, and also provide a plan that will maintain acceptable air quality in areas that are not exceeding the NAAQS. The Ohio SIP is included in the Ohio Administrative Code,[5] (OAC) Chapter 3745, which incorporates, by reference, the requirements under NEPA[6] and the provisions of the CAA.[7]

[2] The State Implementation Plan (SIP) is the State air agency document that sets forth the strategy intended to reduce air emissions in an area of poor air quality and maintain the quality of the air relevant to the Federal air quality standards.

[3] "Ambient air" is defined as that portion of the atmosphere, external to buildings, to which the general public has access. The air that is within the fenced in or guarded area of facility property is not ambient.

[4] The CMH Proposed Project is applicable under NEPA air quality provisions because the project is not defined as excluded, an advisory, or in response to an emergency as defined in Chapter 3 of FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, June 8, 2004.

[5] Ohio Administrative Code (OAC) Chapter 3745-21-02 *Ambient Air Quality Standards and Guidelines*, November 5, 2002 available on the Internet at http://onlinedocs.andersonpublishing.com/oh /lpExt.dll?f=templates&fn=main-h.htm&cp=PORC.

[6] Ohio Administrative Code (FAC), Chapter 62-204.800, *Federal Regulations Adopted by Reference*, incorporated the NAAQS into the Ohio SIP.

[7] Ohio Administrative Code (OAC) Chapter 3745-101-20 *Savings Provisions*, December 31, 2004, available on the Internet at http://onlinedocs.andersonpublishing.com/oh /lpExt.dll?f=templates&fn=main-h.htm&cp=PORC.

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# II. REGULATORY REQUIREMENTS

The assessment of air quality would be prepared in accordance with the guidelines provided in the FAA *Air Quality Procedures for Civilian Airports & Air Force Bases,*[8] and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, which together with the guidelines of FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, constitutes compliance to all the relevant provisions of NEPA and the CAA.

**NEPA**

The USEPA established a set of standards, or "criteria," for six pollutants determined to be harmful to human health and welfare.[9] The standards for the criteria pollutants are known as the National Ambient Air Quality Standards (NAAQS). Also established was the provision that a SIP will include the strategy that a state environmental agency intends to use to meet and maintain the NAAQS within a given timeframe. To ensure Federal projects will comply with the NAAQS and not interfere with the goals of the SIP, the CAA established the Transportation Conformity Rule for Federal highway and transit projects, and established the General Conformity Rule for all other general Federal actions, including airport improvement projects. The USEPA considers the following six criteria pollutants to be indicators of air quality:

- Ozone ($O_3$)
- Carbon monoxide (CO)
- Nitrogen dioxide ($NO_2$)
- Particulate matter ($PM_{10}$ and $PM_{2.5}$)[10]
- Sulfur dioxide ($SO_2$)
- Lead (Pb)

For each of these pollutants, the USEPA established primary standards intended to protect public health, and secondary standards for the protection of other aspects of public welfare, such as preventing materials damage, preventing crop and vegetation damage, and assuring good visibility. Areas of the country where air pollution levels consistently exceed these standards may be designated "nonattainment" by the USEPA. The NAAQS are summarized in **Table 1**.

8 FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
9 Title 40 of the Code of Federal Regulations (40 CFR) Part 50 *National Primary and Secondary Ambient Air Quality Standards* (NAAQS).
10 $PM_{10}$ and $PM_{2.5}$ are airborne inhalable particles that are less than 10 micrometers and less than 2.5 micrometers in diameter, respectively. $PM_{2.5}$ is a subset of $PM_{10}$ emissions.





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**Table 1**
**NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)**

| POLLUTANT | AVERAGING PERIOD | PRIMARY STANDARDS | SECONDARY STANDARDS |
|---|---|---|---|
| Sulfur Dioxide ($SO_2$) | Annual Arithmetic Mean<br>24-Hour Average<br>3-Hour Average | 0.03 PPM<br>0.14 PPM<br>None | None<br>None<br>0.50 PPM |
| Particulate Matter ($PM_{10}$) | Annual Arithmetic Mean<br>24-Hour Average | 50 $\mu g/m^3$<br>150 $\mu g/m^3$ | 50 $\mu g/m^3$<br>150 $\mu g/m^3$ |
| Particulate Matter ($PM_{2.5}$) | Annual Arithmetic Mean<br>24-Hour Average | 15 $\mu g/m^3$<br>65 $\mu g/m^3$ | 15 $\mu g/m^3$<br>65 $\mu g/m^3$ |
| Carbon Monoxide (CO) | 8-Hour Average<br>1-Hour Average | 9 PPM<br>35 PPM | None<br>None |
| Ozone ($O_3$) | 8-Hour Average<br>1-Hour Average | 0.08 PPM<br>0.12 PPM | 0.08 PPM<br>0.12 PPM |
| Nitrogen Dioxide ($NO_2$) | Annual Arithmetic Mean | 0.053 PPM | 0.053 PPM |
| Lead (Pb) [1] | 3-Month Arithmetic Mean | 1.5 $\mu g/m^3$ | 1.5 $\mu g/m^3$ |

Note: PPM is parts per million
$\mu g/m^3$ is micrograms per cubic meter

1 Airborne lead in urban areas is primarily emitted by vehicles using leaded fuels. The chief source of lead emissions at airports would be the combustion of leaded aviation gasoline in small piston-engine general aviation aircraft. However, the USEPA and FAA have determined that an exceedance of the lead standard would be unlikely at an airport because of the use of low-lead fuel for piston-engine aircraft. Therefore, emissions of lead were not considered in this analysis.

Sources: 40 CFR Parts 50.4 through 50.12.
FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
Ohio Administrative Code (OAC), Chapter 3745.

Dispersion modeling for a NAAQS compliance assessment would be conducted pursuant to 40 CFR Part 93.158(b)(1 and 2):

93.158(b) The areawide and/or local air quality modeling analyses must:
(1) Meet the requirements in 40 CFR Part 93.159; and
(2) Show that the action does not:
(i) cause or contribute to any new violation of any standard in any area; or
(ii) increase the frequency or severity of any existing violation of any standard in any area.

In 40 CFR Part 93.159, the USEPA outlines the procedures to be followed for the preparation of dispersion analyses, such as what planning assumptions the analyses should be based on, what version of motor vehicle emissions models to use, required compliance to the USEPA "Guideline on Air Quality Models", which is found in Appendix W of 40 CFR Part 51, and the future years for which an analysis should be prepared.

In FAA Order 1050.1E, the FAA and USEPA determined that an analytical assessment of compliance to the NAAQS due to a Federal airport action is not always required or necessary. Rather, the requirement is dependent upon the nature of the project and the size of the airport as evaluated through the application of screening criteria.[11] The screening criteria consider two factors: the annual number of passengers[12] and the number of combined general aviation and air taxi aircraft operations at the airport. An airport that accommodates or projects to accommodate more than 2.6 million annual passengers (or 1.3 million annual enplanements) or if the airport operates or projects to operate more than 180,000 combined general aviation and air taxi aircraft operations annually, an analysis to assess the Federal action against the NAAQS should be considered. The relationship between these two factors is incorporated into the following equation, which should be used as a guide for determining whether a NAAQS assessment should be considered for an airport project:[13]

$$3.5 - [(1.346 \times MAP) + (0.0194 \times GA)] < 0$$

Where, MAP is the millions of annual passengers, and GA denotes the combined annual general aviation and air taxi aircraft operations, given in 1,000's. When this statement is true, a NAAQS assessment is indicated; if false, and the solution is >0, then a NAAQS comparison analysis would not be required. There are approximately 184,500 combined GA and air taxi aircraft operations each year at CMH. Application of this data to the above equation, regardless of the number of enplanements, indicates that a NAAQS assessment would be required for a proposed Federal action at CMH. The NAAQS assessment would specifically examine the pollutant concentrations (in parts per million) of $NO_x$, $SO_x$, $PM_{10}$, $PM_{2.5}$, and CO.

11 The requirement for a NAAQS assessment would also depend on whether the Federal action is exempt or advisory in nature. The CMH Proposed Project is neither exempt nor an advisory.

12 Includes enplanements and deplanements, and transfer passengers, but excludes through passengers.

13 FAA, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.





## Clean Air Act

The CAA Amendments of 1990 included provisions to ensure emissions from Federal actions will comply with the goals of the SIP and will not interfere with the plans to improve air quality in a nonattainment or maintenance area. Compliance to the SIP requires the sponsoring Federal agency to prepare an analytical demonstration of the potential for significant air quality impacts from Federal actions unless the action is exempt under the CAA regulations, or is a project included in the sponsoring agency's Presumed to Conform List.[14]

The USEPA promulgated the conformity regulations on November 24, 1993[15] to assist Federal agencies in complying with the SIP by specifying rules for two categories of Federal actions: transportation actions and general actions. The two rules have separate and distinct applicability and evaluation requirements. Transportation conformity applies to highway and transit projects, and general conformity regulations apply to all other Federal actions that are not transportation projects, such as airport improvement projects.

*General Conformity Rule Applicability*

The General Conformity Rule under the CAA establishes minimum values, referred to as the de minimis thresholds, for the criteria and precursor pollutants[16] for the purpose of:

- Identifying Federal actions with project-related emissions that are clearly negligible (de minimis),
- Avoiding unreasonable administrative burdens on the sponsoring agency, and,
- Focusing efforts on key actions that would have potential for significant air quality impacts.

Notably, there are no de minimis thresholds to account for ozone emissions. This is because ozone is not directly emitted from a source. Rather, ozone is formed through photochemical reactions involving emissions of nitrogen oxides ($NO_x$), volatile organic compounds (VOC), and abundant sunlight. Therefore, emissions of ozone on a project level are evaluated based on emissions of the ozone precursor pollutants, $NO_x$ and VOC. Although $PM_{2.5}$ is sometimes emitted directly, fine particle emissions can form resulting from chemical reactions involving emissions of the $PM_{2.5}$ precursor pollutants $NO_x$, VOC, sulfur oxides ($SO_x$), and ammonium ($NH_4$).

14 The Proposed Project at CMH is neither exempt nor is the project included on the FAA Presumed to Conform List.

15 Federal Register Volume 58, p. 62188 (58 FR 62188), dated November 24, 1993.

16 Precursor pollutants are pollutants that are involved in the chemical reactions that form the resultant pollutant. Ozone precursor pollutants are $NO_x$ and VOC, whereas $PM_{2.5}$ precursor pollutants include $NO_x$, VOC, $SO_x$, and ammonium ($NH_4$).

Conformity to the de minimis thresholds is relevant only with regard to those pollutants and precursor pollutants for which the area is nonattainment or maintenance. The de minimis rates vary depending on the severity of the nonattainment area and further depend on whether the general Federal action is located inside an ozone transport region.[17] The General Conformity Rule (the Rule), published under 40 CFR Part 93,[18] applies only to general Federal actions that are:

- Federally-funded or Federally-approved,
- Not a highway or transit project,
- Not identified as an exempt project[19] under the CAA,
- Not a project identified on the approving Federal agency's Presumed to Conform list,[20] and,
- Located within a nonattainment or maintenance area.

Otherwise, the Federal action is not applicable under the Rule. When the action is applicable under the general conformity regulations, the net emissions due to the Federal action may not equal or exceed the applicable de minimis thresholds unless:

- An analytical demonstration is provided that shows the emissions would not exceed the NAAQS, or
- Net emissions are accounted for in the SIP planning emissions budget, or
- Net emissions are otherwise accounted for by applying a solution prescribed under 40 CFR Part 93.158.

The Federal de minimis thresholds, which are adopted by reference in the Ohio Administrative Code,[21] are given in **Table 2**, *Clean Air Act De Minimis Thresholds.*

[17] An ozone transport region (OTR) is a single transport region for ozone (within the meaning of Section 176A(a) of the CAA), comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia, as given at Section 184 of the CAA.

[18] USEPA, 40 CFR Part 93, Subpart B *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, July 2006.

[19] The CMH Proposed Project is not listed as an action exempt from a conformity determination pursuant to 40 CFR Part 93.153(c). An exempt project is one that the USEPA has determined would clearly have no impact on air quality at the facility, and any net increase in emissions would be so small as to be considered negligible.

[20] The provisions of the CAA allow a Federal agency to submit a list of actions demonstrated to have low emissions that would have no potential to cause an exceedance of the NAAQS and are presumed to conform to the CAA conformity regulations. This list would be referred to as the "Presumed to Conform" list. The FAA is currently developing a Presumed to Conform list of airport projects that would not require evaluation under the general conformity regulations.

[21] Ohio Administrative Code (OAC) Chapter 3745-101-20 *Savings Provisions*, December 31, 2004, available on the Internet at http://onlinedocs.andersonpublishing.com/oh/lpExt.dll?f=templates&fn=main-h.htm&cp=PORC.





**Table 2**
**CLEAN AIR ACT DE MINIMIS THRESHOLDS**

| POLLUTANT TYPE AND VIOLATION SEVERITY | NONATTAINMENT AREA THRESHOLD EMISSIONS (tons per year) | MAINTENANCE AREA THRESHOLD EMISSIONS (tons per year) |
|---|---|---|
| **Carbon Monoxide** (CO) | 100 | 100 |
| **Particulate Matter** ($PM_{10}$) | | 100 |
| Moderate Nonattainment Area | 100 | |
| Serious Nonattainment Area | 70 | |
| **Particulate Matter** ($PM_{2.5}$) | 100 | 100 |
| Precursor pollutants $SO_2$, $NO_x$, VOC, & $NH_4$[1] | 100 | 100 |
| **Sulfur Dioxide** ($SO_2$) | 100 | 100 |
| **Nitrogen Dioxide** ($NO_2$) | 100 | 100 |
| **Lead** (Pb) | 25 | 25 |
| **Ozone**[2] ($O_3$) | VOC/NOx | VOC/$NO_x$ |
| Serious Nonattainment Area | 50/50 | |
| Severe Nonattainment Area | 25/25 | |
| Extreme Nonattainment Area | 10/10 | |
| Inside an ozone transport region[3]: | | 50/100 |
| Marginal Nonattainment Area | 50/100 | |
| Moderate Nonattainment Area | 50/100 | |
| Outside an ozone transport region[3]: | | 100/100 |
| Marginal Nonattainment Area | 100/100 | |
| Moderate Nonattainment Area | 100/100 | |

[1] $NH_4$ is the chemical formula for ammonium (ammonia), a precursor to the development of $PM_{2.5}$. Net emissions of pollutants determined by USEPA as precursors, or contributors, to $PM_{2.5}$ emissions include $SO_x$, $NO_x$, VOC, and $NH_4$, and are each limited to net emissions of 100 tons per year in a $PM_{2.5}$ nonattainment or maintenance area.

[2] The rate of increase of ozone emissions is not usually evaluated in an environmental review because the formation of ozone occurs on a regional level and is the result of the photochemical reaction of $NO_x$ and VOC in the presence of abundant sunlight. Therefore, USEPA considers the rates of increase of $NO_x$ and VOC emissions to reflect the likelihood of ozone formation on a project level.

[3] An ozone transport region (OTR) is a single transport region for ozone, comprised of the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia.

Source: 40 CFR Part 93.153(b)(1), July 2006.
CAA Title 1, Section 176A(a) and Section 184.
71 FR 17003, April 5, 2006, *$PM_{2.5}$ De Minimis Emission Levels for General Conformity Applicability.*

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Franklin County is included in a nonattainment area for both ozone and emissions of $PM_{2.5}$; further, the Proposed Project meets all the remaining criteria indicating the general conformity regulations would apply to the Proposed Project for CMH. Because Franklin County is nonattainment for ozone, project-related net emissions of the ozone precursor pollutants $NO_x$ and VOC, would be evaluated in this air quality assessment and compared against the minimum threshold of 100 tons per year, each. Like ozone, the net emissions of $PM_{2.5}$ and the precursor pollutants[22] $SO_x$, $NO_x$, and VOC would be evaluated and compared against the minimum threshold of 100 tons per year, each. If the general conformity evaluation for this air quality assessment were to show that any of these thresholds were equaled or exceeded due to the Proposed Project, further more detailed analysis to demonstrate conformity would be required, referred to as a General Conformity Determination. If the general conformity evaluation were to show that none of the thresholds were equaled or exceeded, the Proposed Project at CMH would be assumed to conform to the Ohio SIP and no further analysis would be required under the CAA unless the project is shown to be regionally significant under the general conformity regulations.

*Regional Significance Under General Conformity*

A regionally significant Federal action under the CAA is one where the total direct and indirect emissions (net emissions) represent greater than ten percent of the total emissions of any pollutant in the nonattainment or maintenance area, as provided in the SIP emissions budget. According to the USEPA and the FAA, it would be unlikely that an airport improvement project would cause an increase in net emissions that is regionally significant.[23] Therefore, the Proposed Project at CMH was assumed not to be regionally significant as defined under the general conformity regulations.

*Transportation Conformity Rule Applicability*

Although airport improvement projects are considered under the general conformity regulations, there are elements of a proposed project alternative that may require an analysis to show transportation conformity, such as actions relating to transportation plans, programs, or projects developed, funded, or approved under Title 23 United States Code (U.S.C.) or the Federal Transit Act.[24] In such case, the sponsoring Federal agency would be required to coordinate with the Federal Highway Administration (FHWA), the State Department of Transportation (DOT), and the local metropolitan planning organization (MPO) to assist in completing a transportation conformity evaluation. As with general conformity, transportation

22 Emissions of ammonium ($NH_4$) are generally associated with commercial animal agriculture, including feeding operations. Therefore, emissions of $NH_4$ were not included in this analysis.
23 FAA, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
24 USEPA, 40 CFR Part 93.153, *Applicability*, July 2006.





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conformity regulations apply only to Federal actions located within a nonattainment or maintenance area.

The Proposed Project at CMH includes the realignment of a short section of Stelzer Road; however, realignment of this roadway is not a highway or transit project requiring FHWA or DOT approval.[25] Therefore, the transportation conformity regulations would not apply to the CMH Proposed Project.

**Indirect Source Review**

Some states require an air quality review when a Federal action has the potential to cause an increase in net emissions from indirect sources. Indirect sources cause emissions that occur later in time or are farther removed from the Federal action. Depending on the state, indirect sources may be identified as motor vehicles on highways, parking at sports and entertainment facilities, or an increase in aircraft operations. The state requirement is referred to as the Indirect Source Review (ISR) and each state requiring an ISR sets thresholds for increased operation of the indirect sources. When a Federal action has the potential to exceed these thresholds, an air quality review is required to assess the character and impact of the additional emissions, which is separate from the analyses required under NEPA or the CAA. According to FAA, *Air Quality Procedures for Airports and Air Force Bases*,[26] Ohio is not listed as one of the states requiring an ISR.

# III. MODELING APPROACH

The air quality assessment will include the following analyses:

- Emissions inventory
- Construction emissions inventory
- Dispersion analysis

25 USEPA, 40 CFR Part 51.394, *Applicability*, July 2006.
26 FAA, *Air Quality Procedures for Civilian Airports & Air Force Bases*, Appendix J, April 1997.

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## Emissions Inventory of Criteria and Precursor Pollutants

A local-area[27] inventory of all direct and indirect emissions will be prepared to disclose the air quality impact of the existing conditions and the relevant project alternatives, including the future baseline conditions, which will be compared to disclose the impact to air quality under each relevant project alternative. The emissions inventory for the Proposed Project[28] and the baseline inventory of the same future year will be compared to determine the project's compliance to the General Conformity Rule under the CAA.

The emissions inventories will present estimated emissions in tons per year for the following criteria and precursor pollutants:

- Carbon monoxide (CO)
- Volatile organic compounds (VOC)
- Nitrogen oxides ($NO_x$)
- Sulfur oxides ($SO_x$)
- Particulate matter ($PM_{10}$ and $PM_{2.5}$)
- Volatile organic compounds (VOC)

The emissions inventories will be estimated using the FAA Emissions and Dispersion Modeling System (EDMS) computer model Version 4.5 applying average meteorological conditions for temperature and mixing height. The FAA EDMS computer program is the FAA-required and USEPA-approved model for estimating emissions and calculating pollutant concentrations from airport-specific sources, such as aircraft engines, ground support equipment (GSE) and auxiliary power units (APUs). The model is also approved for modeling emissions from motor vehicles on roadways and in parking lots, and modeling emissions from stationary sources such as heating plants (boilers) and fuel storage tanks.

27 A local-area inventory focuses on emissions over a relatively limited area from a single source or closely related sources, which is in contrast with a regional emissions inventory typically prepared by the metropolitan planning organization (MPO) for the regional transportation system.
28 The project alternative relevant for evaluation under general conformity regulations would be the alternative that would ultimately be funded or approved by the FAA.





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## Construction Equipment Emissions Inventory

An inventory of emissions from the use of construction equipment is a regulatory requirement because construction equipment are considered a direct source of emissions. The construction equipment emissions inventory will be prepared using USEPA-approved methodology and equipment emissions factors from either the USEPA NONROAD computer database or 40 CFR Part 89.[29] The emissions inventory from construction equipment will be prepared using the Microsoft EXCEL® spreadsheet program and will consider the use of construction equipment by type (i.e. bulldozer, backhoe), by horsepower, by load factor, and by hours of use to complete each construction phase.

## Dispersion Analysis

A dispersion analysis will be conducted based on the emissions inventory of all airport sources (excluding construction), for existing conditions and for the future alternatives, including the future baseline conditions. The dispersion analysis will be conducted using the FAA Emissions and Dispersion Modeling System (EDMS) computer model and applying one full year of meteorological data (surface observations and upper air data).

For purposes of the Draft EIS, the dispersion analysis of 2006/2007 Existing Conditions would include a polar grid of receptors placed every ten degrees along the boundary of airport property as measured from the airport reference point (ARP). Two additional rings of receptors would be placed 500 feet apart beyond the property line, establishing 108 receptors. Additional receptors would be placed in typically high-concentration areas such as parking lots and along the curbfront where passengers are departing and arriving, establishing a maximum of 30 additional receptors. A maximum of five receptors would also be placed in sensitive nearby residential areas. This would establish a total of no more than 143 dispersion receptors for the 2006/2007 Existing Conditions. The dispersion analysis for just the 2006/2007 Existing Conditions would be expected to require at least 30 hours of computer time when running the EDMS. The dispersion analysis for the Draft EIS 2012 and 2018 project alternatives would be limited to 10 discrete receptors selected as a result of agency coordination and based on the results of the dispersion assessment conducted for the 2006/2007 Existing Conditions.

Dispersion analysis of all cases provided in the Final EIS would be limited to five discrete receptor locations for each case selected as a result of agency coordination and based on the results of the dispersion assessment provided in the Draft EIS.

29 40 CFR Part 89.112 *Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards.*

# IV. DATA REQUIREMENTS

Data is required for the preparation the construction equipment emissions inventory, and both the inventory and dispersion of emissions of the criteria pollutants. This data would include parameters that describe the operational characteristics of the various sources of air emissions at the airport.

## Construction

Data relating to construction phasing and construction equipment schedules for the Proposed Project will be required. The phasing schedules should include the type of equipment planned for use for each construction phase/task and the monthly hours of operation of each unit of equipment. ***If this data cannot be provided in sufficient detail, the Landrum & Brown air quality team will estimate construction emissions based on similar airport improvement projects.***

## Aircraft and Airport

The emissions inventory and dispersion analysis of emissions from aircraft operations utilizes data defining the aircraft fleet mix, airport operational statistics, ground support equipment (GSE), and uses the digital airport layout plan (ALP).

1. ***Aircraft Fleet:*** A table summarizing the aircraft fleet under all project years and all project alternatives would include the peak-hour operations, by specific aircraft type (Boeing 737-500, Regional Jet, etc., as opposed to categories of aircraft, i.e. jets, turboprops, commuters, etc).

2. ***Airport Operational Statistics:*** Airport operational statistics are used in air quality computer modeling to provide the most realistic description of existing airport emissions. Tables summarizing the following would be used for existing conditions and for each project alternative:

   - Average taxi time, by aircraft type
   - Average departure queue time, by aircraft type
   - Gate use, by aircraft type
   - Taxiway use, by aircraft type
   - Runway use, by aircraft type
   - Maximum departure queue time, by runway end
   - Maximum departure queue length, by runway end
   - Monthly, daily, and hourly operational profiles

3. ***Ground Support Equipment (GSE):*** Ground support equipment assignments will be identified through an on-site survey conducted and evaluated by the consulting air quality team.





4. ***Digital Airport Layout Diagram:*** The current approved Airport Layout Plan (ALP) in digital form will be used for identifying Cartesian coordinate gridpoints for dispersion analyses.

## Surface Transportation

Existing and future traffic information would be required to assess emissions from on-airport roadways.

- USEPA MOBILE vehicle emissions factors used for local surface transportation modeling will be used in evaluating impacts from surface transportation.
- Peak-hour traffic counts for the exits and entrances to the major on-airport parking lots and parking garages would be used, particularly for those lots and garages for which modifications/relocations are proposed for the project alternatives. This data should account for the on-airport transport of rental cars including buses, taxicabs, hotel shuttle vans and buses, and cargo trucks. Also included would be any off-airport employee parking lots.
- Peak-hour traffic counts would be used for the curbfront arrival and departure areas.

## Stationary Sources

A complete collection of data for stationary emissions sources that currently exist and also those that may be modified or introduced in the 2012 or 2018 project alternatives would be used for the air quality assessment. This information would be obtained through an on-site survey conducted and evaluated by the consulting air quality team. The data would relate to the following sources, to the extent possible:

- Heating plants (boilers)
- Incinerators
- Fuel storage tanks
- Solvent degreasing operations
- Surface coating operations
- Emergency generators

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Types of information with regard to these sources would include, but would not be limited to:

- Source location
- Fuel type, paint type, solvent type, etc., however applicable
- Associated equipment use (fire trucks, generators for paint application)
- Annual fuel throughput, annual paint/solvent use, etc., however applicable
- Capacity, size, or other characteristics of the source
- Frequency of use

**Meteorology**

Computer modeling for air quality requires meteorological data for the project site. Meteorology used for the emissions inventory and for dispersion modeling for Federal actions under NEPA should be consistent with data used in regional transportation modeling. Meteorological data will include:

- Average annual temperature
- Average annual mixing height
- One year of on-site hourly surface aviation observations
- One year of on-site, or most appropriate, upper-air observations, corresponding to the year available for surface observations

The choice of what full year of data to use for dispersion analysis would be determined through agency coordination.

**Background Concentrations**

A dispersion analysis must disclose the "design concentration" for each pollutant standard. The design concentration would be the sum of the concentration of each pollutant estimated by modeling at specified receptor locations, along with the existing background concentration of that pollutant as determined through USEPA monitoring. Background concentration for emissions of CO, $SO_2$, $NO_2$, $PM_{10}$, and $PM_{2.5}$ would be used for the existing conditions. The level of future background concentrations will be estimated using historical data with the application of a regression trend calculation, which is available in the Microsoft EXCEL® spreadsheet program.

**Modeling Assumptions**

Default values will be used for modeling parameters that cannot be provided specific to the CMH EIS. A complete set of input data for each emissions inventory and dispersion analysis would be available for agency review of the Draft EIS and would be appended to the written report in the Final EIS.





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# V. NEXT STEPS

Written comments and/or questions regarding the discussion or material provided during this scoping meeting should be mailed within 30 days following the scoping meeting or no later than ***August 19, 2006***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174

**Email:** CMHEIS@FAA.GOV

**Website:** www.Airportsites.net/CMH-EIS

***This scoping document is provided as a draft and should not be considered the final authority for assessing air quality for either the Draft CMH EIS or Final CMH EIS. As the project progresses, changes in planning will require adjustments of the methodology and procedures given in this document.***

## PORT COLUMBUS INTERNATIONAL AIRPORT ENVIRONMENTAL IMPACT STATEMENT

### Federal Aviation Administration

### AIR QUALITY SCOPING MEETING

**Wednesday July 19, 2006**
**9:00 a.m. to 12:00 noon**

**Ohio EPA Central Office**
**122 South Front Street**
**Columbus, OH 43216**

## AGENDA

*Welcome ......................................... Katy Jones, Federal Aviation Administration*

*I. Introduction ............................................Virginia Raps, Landrum & Brown*

*II. Regulatory Requirements........................................................ Discussion*

*III. Modeling Approach ................................................................ Discussion*

*IV. Data Requirements ................................................................ Discussion*

*V. Conformity............................................................................. Discussion*

* * * * *

**AGENCY CONTACT:** Ms. Katherine Jones
Federal Aviation Administration
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**Email:** CMHEIS@FAA.GOV
**Website:** www.Airportsites.net/CMH-EIS

# SIGN-IN SHEET

**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Wednesday, July 19, 2006**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Environmental Impact Statement

| | |
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|---|---|
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# SIGN-IN SHEET

ON THE PHONE:
TIM ARNDT
JILL FOSTER
PAT MORRIS
SUZANNE KING

**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Wednesday, July 19, 2006**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Environmental Impact Statement

| | |
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**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Wednesday, July 19, 2006**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Environmental Impact Statement

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**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Wednesday, July 19, 2006**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Environmental Impact Statement

| | |
|---|---|
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Columbus, Ohio
**Wednesday, July 19, 2006**

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**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Wednesday, July 19, 2006**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Environmental Impact Statement

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| FAX NUMBER | |

## Air Quality

### Environmental Impact Statement

### Port Columbus International Airport

Presented to: Air Quality Scoping Meeting
OEPA Columbus, Ohio

By: Virginia Raps, Air Quality Manager
Chris Babb, Air Quality Consultant
Landrum & Brown

Date: Wednesday, July 19, 2006


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## DRAFT Deliberative Material - DO NOT CITE OR QUOTE

***This scoping document is provided as a draft and should not be considered the final authority for assessing air quality for either the Draft CMH EIS or Final CMH EIS. As the project progresses, changes in planning will require adjustments of the methodology, procedures, and information given in this document.***

## SIGN-IN SHEET

***Fill out contact information or attach your business card. Remember to include your e-mail address!***

## AGENDA

I. PROPOSED PROJECT AND BACKGROUND
II. REGULATIONS AND GUIDELINES
III. AIR QUALITY COMPUTER MODELS
IV. DEVELOPMENT OF SOURCE DATA
V. EMISSIONS INVENTORY
VI. DISPERSION MODELING
VII. OUTSTANDING DATA NEEDS



## I. PROPOSED PROJECT AND BACKGROUND

The Federal Aviation Administration (FAA) is preparing an Environmental Impact Statement for the Port Columbus International Airport (CMH EIS).


- Proposed replacement of Runway 10R/28L
- Terminal development
- Realignment of Stelzer Road

## Analysis Years

The following scenarios would be examined :

- 2006/2007 Existing Conditions
- 2012 Baseline and Project Alternatives
- 2018 Baseline and Project Alternatives

---

- Year of greatest emissions (inventory only)
- SIP Attainment Year (inventory only, if necessary)
- SIP Emissions Budget Year (inventory only, if necessary)

## Purpose of the Assessment

CAA Sec. 176(c)(1) must be satisfied:

(c)(1) No agency shall engage in, support, fund, or approve an action that does not conform to a state implementation plan. Conformity to an implementation plan means:

(A) Conformity to a plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards; and

(B) that the action will not:

(i) Cause or contribute to any new violation of any standard in any area

(ii) Increase the frequency or severity of any existing violation of any standard

(iii) Delay timely attainment of any standard or milestone

## Goals of Scoping

Over the course of the project, there will be air quality scoping meetings scheduled to:

- Obtain concurrence with procedures/methodology
- Exchange data
- Determine the general and transportation conformity requirements



## Criteria and Precursor Pollutants

- Carbon monoxide (CO)
- Coarse particulate matter ($PM_{10}$)
- Fine particulate matter ($PM_{2.5}$)
- Sulfur oxides ($SO_x$)
- Nitrogen oxides ($NO_x$)
- Volatile organic compounds (VOC)

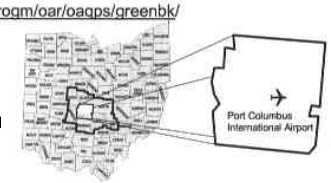
***Ozone is evaluated through emissions of $NO_x$ and VOC. Lead is not a significant pollutant at airports.***

## Franklin County Nonattainment

- Franklin County is nonattainment for the new ***eight-hour ozone*** standard
- Also nonattainment for the new ***fine particulate matter ($PM_{2.5}$)*** standard

http://www.epa.gov/airprogm/oar/oaqps/greenbk/

Metropolitan Columbus Intrastate Air Quality Control Region



## Pollutants of Concern

For purposes of CAA conformity:

- Fine particulate matter ($PM_{2.5}$)
- Sulfur oxides ($SO_x$)
- Nitrogen oxides ($NO_x$)
- Volatile organic compounds (VOC)

These are criteria pollutants for which Franklin County does not meet the Federal standards, as well as the precursor pollutants to ozone and fine particulate matter formation.

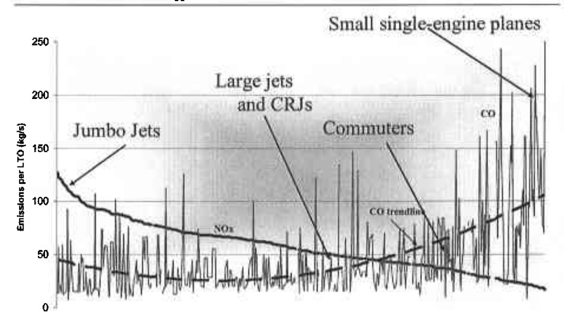
## Relevance of Airport Projects

Pollutant/Noise Trade Offs

- Aircraft engine manufacturers developed high-bypass engines to decrease the noise levels and conserve fuel.
- High-bypass engines combust fuel at much higher temperatures.
- The higher temperatures produce a greater quantity of $NO_x$ in the engine exhaust.



## Compare $NO_x$ to CO Engine Emissions




## Ohio State Implementation Plan


Ohio Administrative Code Chapter 3745


http://www.epa.gov/reg5oair/sips/

## 2005 MORPC Conformity Demonstration

MORPC Central Ohio Air Quality Analysis

The AQ conformity determination document that includes Franklin County, April 28, 2005 is available at:

www.morpc.org/web/transportation/tplan/documents/1AQ.pdf

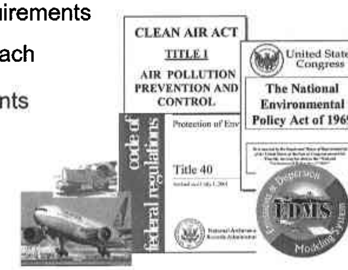
## Ohio SIP Emissions Budget

- 2005 conformity determination includes the emissions budget year 2010.
- Budgets are published for VOC and $NO_x$ by source type (point, area, mobile).
- No budget for $PM_{2.5}$ emissions was found.



## Today's Discussion

- Regulatory requirements
- Modeling approach
- Data requirements




## II. REGULATIONS AND GUIDELINES

- National Environmental Policy Act (NEPA)
- Clean Air Act (1990 Amendments) CAA Title I, including General Conformity
- Federal agency guidelines

## USEPA - NEPA

- Purpose of NEPA is to disclose the impacts from the Federal Action, unless the action is ***excluded, an emergency, or an advisory***.
- Air quality assessment prepared to determine whether or not a Federal action has the potential to adversely impact air quality.
- Air quality impacts are assessed by evaluating project emissions against the National Ambient Air Quality Standards (NAAQS).

## National Ambient Air Quality Standards

National ***and Ohio*** AAQS

| POLLUTANT | AVERAGING PERIOD | PRIMARY STANDARDS | SECONDARY STANDARDS |
|---|---|---|---|
| Sulfur Dioxide ($SO_2$) | Annual Arithmetic Mean | 0.030 PPM | — |
| | 24-Hour Average | 0.14 PPM | — |
| | 3-Hour Average | — | 0.50 PPM |
| Particulate Matter ($PM_{10}$) | Annual Arithmetic Mean | 50 µg/m³ | 50 µg/m³ |
| | 24-Hour Average | 150 µg/m³ | 150 µg/m³ |
| Particulate Matter ($PM_{2.5}$) | Annual Arithmetic Mean | 15 µg/m³ | 15 µg/m³ |
| | 24-Hour Average | 65 µg/m³ | 65 µg/m³ |
| Carbon Monoxide (CO) | 8-Hour Average | 9 PPM | — |
| | 1-Hour Average | 35 PPM | — |
| Ozone ($O_3$) | 8-Hour Average | 0.08 PPM | 0.08 PPM |
| | 1-Hour Average | 0.12 PPM | 0.12 PPM |
| Nitrogen Dioxide ($NO_2$) | Annual Arithmetic Mean | 0.053 PPM | 0.053 PPM |
| Lead (Pb) | 3-Month Arithmetic Mean | 1.5 µg/m³ | 1.5 µg/m³ |



## FAA Screening Criteria

Not every airport project requires dispersion analysis to compare project emissions to the NAAQS.

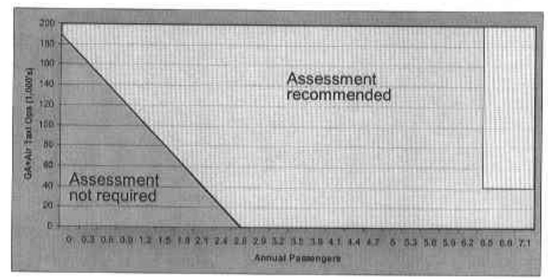
FAA bases the requirement for dispersion analysis on the combined influence of ***annual airport passengers*** and the annual number of ***GA + air taxi operations***.

Criteria: >=2.6 million annual passengers

>=180,000 GA + Air Taxi operations

## FAA Screening Equation

**3.5 – [(1.346 x MAP) + (0.0194 x GA/Taxi Operations)] < 0**



## NAAQS Comparative Assessment

***Dispersion analysis would be required for the CMH Proposed Project.***

To compare the project emissions to the NAAQS, analysis will be conducted for:

- 2006/2007 Existing Conditions
- 2012 Baseline and Project Alternatives
- 2018 Baseline and Project Alternatives

## USEPA – CAA

**Key components to Clean Air Act strategy**

- Ensure Federal funding and approval are for projects that are consistent with air quality goals
- Ensure Federal projects do not worsen air quality or interfere with the purpose of the State Implementation Plan (SIP) to meet and maintain the NAAQS



## CAA Connection to NEPA

- NEPA stipulates that the requirements of the CAA should be met in concert with the NEPA requirements for an EIS.
- The requirements to satisfy NEPA regulations are ***separate and distinct*** from the requirements under the CAA.
- Both analyses may be ***reported jointly*** in one document.

## Compliance to CAA Title 1

- Disclose potential for significant air quality impacts from Federal actions depending on attainment status
- General Conformity Rule applies to airport projects

## General Conformity Rule

Provides screening criteria (thresholds) to:

- Identify Federal actions that have no potential to cause adverse air quality impacts
- Avoid unreasonable administrative burdens
- Focus on Federal actions that have potential for significant air quality impacts

## De minimis Thresholds

| POLLUTANT AND VIOLATION SEVERITY | NONATTAINMENT AREA (tons per year)) | MAINTENANCE AREA (tons per year) |
|---|---|---|
| **Carbon Monoxide** (CO) | 100 | 100 |
| **Particulate Matter** ($PM_{10}$) | | |
| Moderate Nonattainment Area | 100 | 100 |
| Serious Nonattainment Area | 70 | 100 |
| **Particulate Matter** ($PM_{2.5}$) | **100** | 100 |
| **Sulfur Dioxide** ($SO_2$) | 100 | 100 |
| **Nitrogen Dioxide** ($NO_2$) | 100 | 100 |
| **Lead** (Pb) | 25 | 25 |
| **Ozone** ($O_3$) | VOC/NOx | VOC/NOx |
| Serious Nonattainment Area | 50/50 | |
| Severe Nonattainment Area | 25/25 | |
| Extreme Nonattainment Area | 10/10 | |
| Inside an ozone transport region: | | 50/100 |
| Marginal Nonattainment Area | 50/100 | |
| Moderate Nonattainment Area | 50/100 | |
| **Outside an ozone transport region:** | | 100/100 |
| **Marginal Nonattainment Area** | **100/100** | |
| Moderate Nonattainment Area | 100/100 | |



## General Conformity Applicability

Federal actions are subject when the project is:

- Federally-funded or approved
- Not a highway or transit project
- Not exempt or presumed to conform
- Located within a nonattainment area

***CMH Proposed Project is applicable under the General Conformity Rule.***

## General Conformity Evaluation

Emissions inventories will be prepared for 2012 and 2018 for:

- Baselines
- Preferred Alternatives
- Year of greatest emissions (usually construction year)
- SIP Attainment year(s) for ozone and $PM_{2.5}$, if required
- SIP emissions budget years, if required

## General Conformity Determination

If net emissions equal or exceed the applicable de minimis thresholds:

- Conduct dispersion analysis for comparison to the NAAQS (not suitable for $NO_x$ conformity)
- Show the project emissions are accounted for in the SIP
- Apply mitigation that reduces net emissions to zero
- Revise the SIP

## Positive Conformity Findings

If net emissions are below the applicable de minimis thresholds:

- Proposed Project is assumed to conform to the Ohio SIP and no further analysis or reporting is required under CAA General Conformity.
- Results of the analysis are reported in the document.
- No public comment period is required unless the project is regionally significant.



## Regional Significance

FAA and USEPA determined that net emissions from airport projects are not likely to exceed 10% the SIP budget.

***CMH Proposed Project would not be considered regionally significant as defined under the general conformity regulations.***

## Indirect Source Review

The State of Ohio does not require an Indirect Source Review (ISR).

## Governor's Certification

No longer required.

## Transportation Conformity

The CMH Proposed Project does not include any transit or Federal highway projects requiring approval by Ohio DOT.

***Transportation conformity would not apply to the CMH EIS.***

## USEPA Guidelines

- 40 CFR Part 93, Subpart B Federal Guidance
- 40 CFR Part 51, Subpart W State Guidance
- 40 CFR Part 51, Appendix W Guideline for Air Quality Models

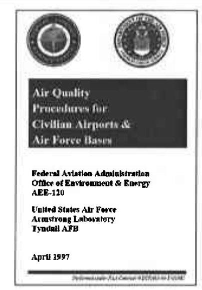



## FAA Guidelines

- FAA *Air Quality Procedures for Civilian Airports & Air Force Bases*
- FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*
- FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*

## FAA Air Quality Handbook

Assessment prepared pursuant to the FAA *Air Quality Procedures for Civilian Airports & Air Force Bases* will be compliant to NEPA, CAA, FAA guidelines, and USEPA guidelines.




http://www.faa.gov/regulations_policies/policy_guidance/envir_policy/airquality_handbook/

## III. AIR QUALITY COMPUTER MODELS

The air quality assessment will require the use of 3 air quality models, depending on the sources to be modeled:

- FAA EDMS
- USEPA MOBILE
- USEPA NONROAD

## Model Depends on Sources at CMH

- Aircraft
- GSE and APUs
- Motor vehicles
- Boilers
- Incinerator
- Fuel Tanks
- Emergency generators
- Construction equipment



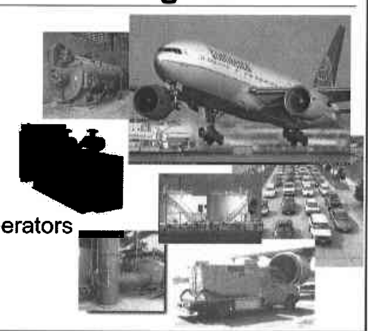
## FAA EDMS

Emissions Inventory and Dispersion Model

- Version 4.5
- FAA-required for airport-specific sources
- USEPA-approved for other sources
- Criteria and precursor pollutants

## Sources Modeled using EDMS

- Aircraft
- GSE and APUs
- Motor vehicles
- Boilers
- Incinerator
- Fuel tanks
- Emergency generators



## MOBILE 6

MOBILE 6 vehicle emission program will provide emission factors for vehicles for use in EDMS.

## MOBILE 6 – Output Files

An EIS uses the same parameters for MOBILE as regional transportation planning.

**Example . . .**

•Scenario Title: QUEUE on Arterial Roadway 55 MPH

•File 1, Run 1, Scenario 1

| Vehicle type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | All Veh |
|---|---|---|---|---|---|---|---|---|---|
| VMT Distribution | 38.92% | 31.58% | 13.79% | 4.09% | 0.04% | 0.21% | 11.01% | 0.35% | 100% |
| Composite Emission Factors (g/mi): | | | | | | | | | |
| Composite VOC | 0.696 | 1.036 | 0.795 | 0.963 | 0.504 | 0.339 | 0.445 | 0.26 | 0.771 |
| Composite CO | 10.99 | 15.02 | 12.76 | 14.33 | 7.99 | 1.268 | 0.887 | 1.746 | 11.371 |
| Composite NOX | 0.74 | 1.145 | 1.201 | 1.162 | 2.795 | 1.229 | 1.368 | 10.941 | 2.144 |



## USEPA NONROAD Model

Used to calculate emissions from nonroad diesel equipment.

NONROAD and 40 CFR Part 89 will be used to estimate emission factors for ***construction equipment***.

## Additional Models

Computer spreadsheets will be used to perform the calculations for ***construction emissions***.

## IV. DEVELOPMENT OF SOURCE DATA

- Data required for calculation of an emissions inventory will also be used for dispersion modeling.

- Additional data is required for dispersion modeling, such as the position of emissions sources in time and space

## Aircraft Fleet

Aircraft information will be derived from the noise analysis, and will be further defined by:

- Aircraft type
- Engine type
- Runway use
- Gate assignment

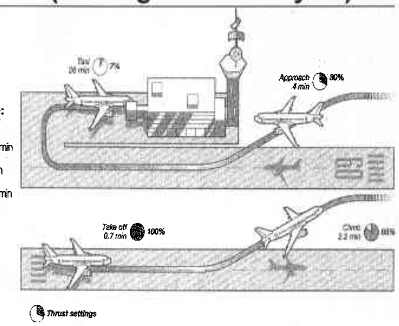
Example of aircraft queuing



## Aircraft LTO (landing & takeoff cycle)

ICAO default power settings:

- take off (100% available thrust) for 0.7 min
- climb (85% available thrust) for 2.2 min
- approach (30% available thrust) for 4.0 min
- taxi (7% available thrust) for 26 min




## Aircraft Taxi and Delay Statistics

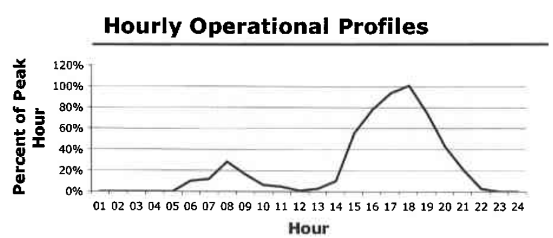
- Average airport taxi time
- Average airport departure queue time
- Max departure queue time, by runway end
- Max departure queue ***length***, by runway end

Example of aircraft queuing

## Airfield Operational Statistics

- Runway use, by aircraft type
- Gate assignment, by aircraft type
- Taxiway assignment, by aircraft type, by gate and runway assignment
- Monthly, daily, and hourly operational profiles

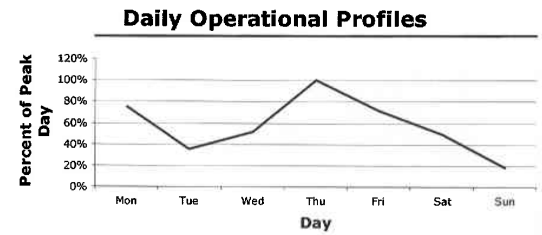
## Operational Profiles – Hourly




**EXAMPLE** airport hourly operational profile



## Operational Profiles - Daily




**EXAMPLE** airport daily operational profile

## Operational Profiles - Monthly


**EXAMPLE** airport monthly operational profile

## Ground Support Equipment Survey

On-site survey was conducted on July 13, 2006 to determine unique assignment of GSE to aircraft at CMH.

Gates were surveyed for the availability of electrical power (400 HZ), preconditioned air, and potable water.

## GSE Characteristics

CMH operates three concourses, A, B, and C, with a total of 45 gate positions.

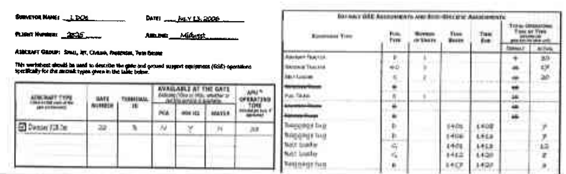
- All emissions of GSE will be assumed to originate in the gate areas.
- Most GSE use diesel fuel.
- No underground hydrant fuel system.



## GSE Survey Methodology

Survey sheets showing EDMS default assignments, by aircraft type, can be compared to actual operational conditions.

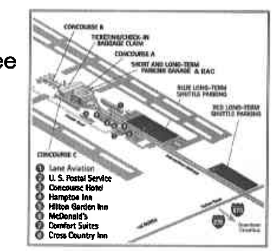
The use of APUs was also surveyed.



## Motor Vehicles

Analysis will include motor vehicles that account for:

- Passenger and employee cars
- Buses, taxi cabs, cargo trucks, rental cars
- Roadways, parking lots, garages



## Stationary Sources

The ***emissions inventory*** will include results from the CMH 2004 Stationary Source Inventory.

The ***dispersion analysis*** will be limited to the larger sources as defined by the 2004 Stationary Source Inventory.

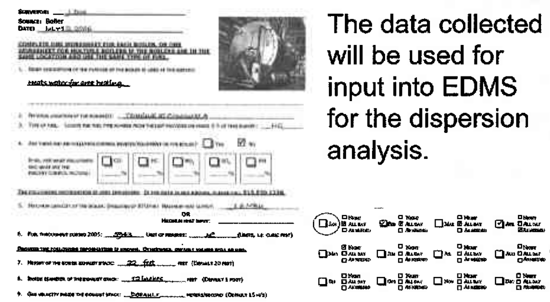
## Stationary Sources Survey

On-site survey was conducted on July 12, 2006 to obtain operational information on the stationary sources that will be considered in the dispersion analysis.

- Larger terminal boilers
- Backup generators
- Incinerator
- Deicing operations



## Survey Methodology



The data collected will be used for input into EDMS for the dispersion analysis.

## V. EMISSIONS INVENTORY

Emissions inventories will be prepared for

- 2006/2007 Existing Conditions
- 2012 Baseline and Preferred Alternative
- 2018 Baseline and Preferred Alternative
- Year of greatest project emissions
- CAA mandated attainment year, if required
- SIP emission budget year, if required

## Net Emissions Evaluation

- EDMS emissions inventory requires input of the annual average temperature and the annual average mixing height.
- After all data is input, EDMS will be run for the future baseline and the Preferred Alternative of the same future year.
- Inventories will be compared to determine "net emissions" for the preferred alternative
- Construction emissions inventory will be prepared.

## Emissions Inventory Meteorology

**52.9 °F**
1971-2000 NCDC Normals
WSO Columbus, Ohio

Holzworth, AP-101, 1/72

**3,052 Feet**
NWS Upper-Air Program
Dayton, Ohio
(this station was closed in 1995)



## EDMS Emissions Inventory

**EXAMPLE**

**Emissions Inventory - Future Baseline (no-build)**
(tons per year)

| | CO | HC | NOx | SOx | PM10/2.5 |
|---|---|---|---|---|---|
| Aircraft | 2,334.36 | 329.39 | 2,090.83 | 99.27 | 5.00 |
| GSE/APU | 1,804.24 | 43.33 | 68.69 | 4.26 | 0.06 |
| Roadways | 790.17 | 137.52 | 53.97 | 2.41 | 2.10 |
| Parking Lots | 224.60 | 50.95 | 7.10 | 0.27 | 0.22 |
| Stationary Sources | 0.99 | 12.94 | 4.99 | 0.03 | 0.15 |
| Training Fires | 35.87 | 1.31 | 0.27 | 0.00 | 9.71 |
| TOTAL | 5,190.25 | 575.45 | 2,225.88 | 106.25 | 17.26 |

**Emissions Inventory - Future Preferred Project (with-project)**
(tons per year)

| | CO | HC | NOx | SOx | PM10/2.5 |
|---|---|---|---|---|---|
| Aircraft | 1,308.53 | 186.14 | 1,954.43 | 80.64 | 2.00 |
| GSE/APU | 1,804.24 | 43.33 | 68.69 | 4.26 | 0.06 |
| Roadways | 790.17 | 137.52 | 46.70 | 2.41 | 2.10 |
| Parking Lots | 224.60 | 50.95 | 6.20 | 0.27 | 0.22 |
| Stationary Sources | 0.99 | 12.94 | 4.99 | 0.03 | 0.15 |
| Training Fires | 35.87 | 1.31 | 0.27 | 0.00 | 9.71 |
| TOTAL | 4,045.90 | 411.57 | 2,081.39 | 87.27 | 13.95 |

## EDMS Inventory Comparison

**EXAMPLE**

**Net Emissions**
(tons per year)

| | CO | HC | NOx | SOx | PM10/2.5 |
|---|---|---|---|---|---|
| Aircraft | -1,025.82 | -143.25 | -136.40 | -18.63 | -3.00 |
| GSE/APU | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Roadways | -118.52 | -20.63 | -8.10 | -0.36 | -0.32 |
| Parking Lots | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Stationary Sources | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Training Fires | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| TOTAL | -1,144.35 | -163.88 | -144.50 | -18.99 | -3.32 |

This **example** general conformity evaluation of the preferred alternative meets the requirements of the CAA; no further analysis or reporting would be required under the conformity rules.

## Construction Equipment

- Based on the construction phasing schedule
- Based on previous airport construction projects
- Tier 1, Tier 2, and Tier 3 emissions factors from 40 CFR Part 89 (defaults use NONROAD)
- EPA methodology used for the calculation, including load factors and HP
- Calculated using computer spreadsheet

## Construction Emissions Inventory

Criteria and precursor pollutant emissions, **EXAMPLE** :

**Construction – Year of Greatest Emissions**
(tons per year)

| EQUIPMENT | CO | HC | $NO_X$ | $SO_X$ | $PM_{10/2.5}$ |
|---|---|---|---|---|---|
| Backhoe | 3.47 | 0.60 | 3.98 | 1.23 | 1.56 |
| Bulldozer | 4.67 | 0.80 | 4.01 | 1.32 | 1.02 |
| Grader | 0.67 | 0.30 | 2.45 | 0.42 | 0.46 |
| Loader | 0.45 | 0.08 | 2.98 | 0.22 | 0.23 |
| Roller | 0.16 | 0.04 | 0.67 | 0.14 | 0.12 |
| Off-Highway Trucks | 7.23 | 1.56 | 10.56 | 1.55 | 1.50 |
| Tractor, off-highway | 9.12 | 1.52 | 8.34 | 0.57 | 1.34 |
| TOTAL | 25.77 | 4.90 | 32.99 | 5.45 | 6.23 |



## VI. DISPERSION MODELING

EDMS:

- Uses one year of surface and upper-air weather data
- Based on the EDMS criteria pollutant inventory

Additional data:

- Cartesian coordinates
- Receptor locations
- Background concentrations

## Dispersion Meteorology


**2005 Hourly Surface Aviation Hourly Observations**
WSO Columbus, Ohio

**2005 Radiosonde Observations**
WSFO Wilmington, Ohio
(program initiated 1995)

## Cartesian Coordinates

Digital file of the existing and future airport layout will be used to determine the (x,y) Cartesian coordinates needed for dispersion modeling.

**Example** of an airport layout in EDMS.

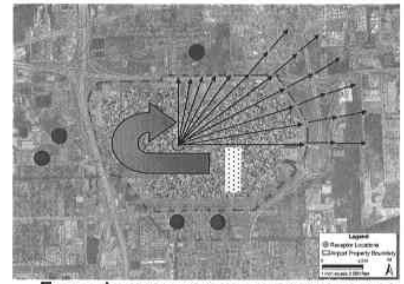
## Receptor Locations

- Determined through agency coordination
- Every 10 degrees around the property line measured from the ARP
- Two additional outward rings, each 500 feet apart
- Smaller, closer points and grids as needed
- Max 143 locations for existing conditions


**Example** of an airport ARP.



## Property-Line Receptor Locations



**Example** of an airport receptors for the Draft EIS.

## Receptors for Draft and Final EIS

- All pollutants all receptors (max 143) will be run for 2006/2007 Existing Conditions, Draft EIS.
- Draft EIS will include analysis for 10 discrete receptors for the future baselines and alternatives based on the results of the 2006/2007 Existing Conditions results.
- Final EIS will include analysis for 5 discrete receptors for the future baselines and alternatives based on the results of the analysis completed for the Draft EIS.

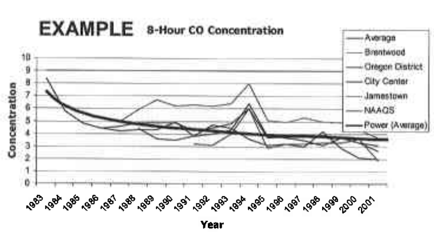
## Background Concentrations

Required to include background concentrations for the "design" value that is compared to the NAAQS.

Franklin County historical background concentration data will be obtained from USEPA's AirData Web site for 2001 – 2005.

## Background Concentration History

Historical data will be plotted and a regression trend line will predict future values.

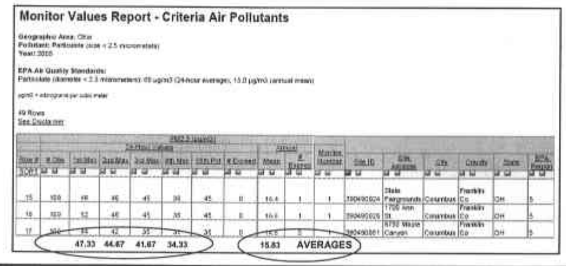





## Columbus AQ Monitor Data

Monitored 2006 $PM_{2.5}$ data for Franklin County

http://www.epa.gov/air/data/geosel.html




## Dispersion Results – EX. 8-HR CO

**EXAMPLE**

**2005 Baseline**

| RECEPTORS | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Airport Sources | 7.23 | 2.41 | 3.98 | 1.46 | 2.55 |
| Intersection | --- | --- | 1.02 | 3.02 | 2.98 |
| Background | 3.16 | 3.16 | 3.16 | 3.16 | 3.16 |
| **Total** | **10.40** | **5.57** | **8.16** | **7.64** | **8.69** |

**2005 Alternative**

| RECEPTORS | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Airport Sources | 6.02 | 2.39 | 3.90 | 1.46 | 2.55 |
| Intersection | --- | --- | 1.00 | 4.02 | 3.43 |
| Background | 3.16 | 3.16 | 3.16 | 3.16 | 3.16 |
| **Total** | **9.18** | **5.55** | **8.06** | **8.64** | **9.14** |

## Project Cannot Worsen Violation

**8-Hour Average Carbon Monoxide** (parts per million) **EPA: 9 PPM**

| BASELINE | 1 |
|---|---|
| Airport Sources | 7.23 |
| Intersection | --- |
| Background | 3.16 |
| Total | 10.40 |

| PROJECT | 1 |
|---|---|
| Airport Sources | 6.02 |
| Intersection | --- |
| Background | 3.16 |
| Total | 9.18 |

EXAMPLE

- Project concentration is >EPA standard of 9 PPM at the future baseline (10.40 PPM).
- Project would decrease the severity of the violation (-1.22 PPM).
- ***Example project complies at this receptor.***

## Project Can Increase Concentration

**8-Hour Average Carbon Monoxide** (parts per million) **EPA: 9 PPM**

| BASELINE | 4 |
|---|---|
| Airport Sources | 1.46 |
| Intersection | 3.02 |
| Background | 3.16 |
| Total | 7.64 |

| PROJECT | 4 |
|---|---|
| Airport Sources | 1.46 |
| Intersection | 4.02 |
| Background | 3.16 |
| Total | 8.64 |

EXAMPLE

- Project concentration is <EPA standard of 9 PPM at the future baseline (7.64 PPM).
- Project would increase the concentration, while not exceeding the EPA standard (+1.00 PPM).
- ***Example project complies at this receptor***



## Project Cannot Create New Violation

**8-Hour Average Carbon Monoxide** (parts per million) **EPA: 9 PPM**

| BASELINE | 5 |
|---|---|
| Airport Sources | 2.55 |
| Intersection | 2.98 |
| Background | 3.16 |
| Total | 8.69 |

| PROJECT | 5 |
|---|---|
| Airport Sources | 2.55 |
| Intersection | 3.43 |
| Background | 3.16 |
| Total | 9.14 |

EXAMPLE

- Project concentration is <EPA standard of 9 PPM at the future baseline (8.69 PPM).
- Project would increase the concentration to >EPA standard (+0.45 PPM).
- ***Example project does not comply at this receptor***

## VII. OUTSTANDING DATA NEEDS

Data for modeling the project's impacts will come from project team members but also from the state and local air agencies.

In addition, the air agencies may offer advice and guidelines for the development of the input data.

## Data Requests

- Digital airport layouts
- MOBILE 6.2 files
- Meteorology
- Background concentrations
- SIP attainment years
- SIP emissions budgets

## Digital Airport layout

- A diagram, in electronic form, is required to locate the emissions sources for dispersion modeling.
- ***Diagrams are requested*** for:
  - o Existing conditions
  - o Future baseline conditions, if different from existing
  - o Future project alternative conditions



## MOBILE 6.2

- MOBILE vehicle emission factors should be the same as used in regional/local transportation air quality modeling.
- Some data available in the 2005 AQ Conformity Determination
- ***Electronic files are requested*** – vehicle speeds and model years will be adjusted

## Meteorology

- ***Guidance is requested*** to confirm methodology and relevance of weather data

## Background Concentrations

- Some MPOs stipulate a value for future background concentrations.
- No $NO_2$ monitors were found for Franklin County.
- ***Guidance is requested for $NO_2$ background concentrations***

## SIP Attainment Years & Budget

- Central Ohio 2005 Conformity Determination indicates 2010 as a budget year for ozone.
- No budget is given for $PM_{2.5}$
- ***Guidance is requested*** with regard to the emissions budget for $NO_x$, VOC, and $PM_{2.5}$
- ***Identification of the SIP attainment years is requested.***



## Schedule for Comments and Data

- Comments requested no later than ***August 19, 2006 (30 days)***
- Data requests should be provided to the FAA by ***October 1, 2006***

**Questions and comments on the CMH EIS Air Quality Assessment:**

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road, Suite 107
Romulus, MI 48174
E-mail: CMHEIS@FAA.GOV
Web site: www.Airportsites.net/CMH-EIS

**From:** Ginny Raps
**Sent:** Thursday, July 20, 2006 7:24 PM
**To:** 'kkaletsky@ColumbusAirports.com'; 'Kamke.Sherry@epamail.epa.gov'; 'Morris.Patricia@epamail.epa.gov'; 'Leslie.Michael@epamail.epa.gov'; 'King.Suzanne@epamail.epa.gov'; 'bill.spires@epa.state.oh.us'; 'sam.macdonald@epa.state.oh.us'; 'sarah.hedlund@epa.state.oh.us'; 'isaac.robinson@epa.state.oh.us'; 'lkoprowski@morpc.org'; 'randy.sanders@dnr.state.oh.us'; 'valerie.croasmun@dot.state.oh.us'; 'thom.slack@dot.state.oh.us'; Rob Adams; 'dwall@columbusairports.com'; 'Irene.Porter@faa.gov'; Chris Babb; 'Foster, Jill'; 'Lengel, John'; 'Katherine.S.Jones@faa.gov'; 'cgawronski@morpc.org'; 'tom.velalis@epa.state.oh.us'; 'william.nichols@epa.state.oh.us'; 'pkennedy@ColumbusAirports.com'; 'bmeleski@ColumbusAirports.com'; Sarah Potter; 'tim_arendt@gspnet.com'
**Subject:** FAA Environmental Impact Statement for Columbus International Airport - Air Quality Scoping meeting, July 19

Attached is the summary of the meeting held yesterday, Wednesday July 19, 2006, to discuss the air quality assessment for the improvements proposed for the Port Columbus International Airport. Please review the document for accuracy and content and direct any comments to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road, Suite 107
Romulus, Michigan 48174
Email:CMHEIS@FAA.GOV.

Written comments and requests should be provided to Ms. Jones no later than August 19, 2006.

Thank you for attending our scoping meeting and for your attention to this summary.

Ginny Raps

**Virginia L. Raps, Project Manager**
***Landrum & Brown, Incorporated***
11279 Cornell Park Drive
Cincinnati, OH 45242
Tel: 513-530-1238
Fax: 513-530-1278
Cell: 937-218-0058
Email: graps@landrum-brown.com
Web: www.landrum-brown.com



# *Federal Aviation Administration*

## ENVIRONMENTAL IMPACT STATEMENT

FOR

## REPLACEMENT RUNWAY AND TERMINAL EXPANSION

AT

## PORT COLUMBUS INTERNATIONAL AIRPORT

### AIR QUALITY SCOPING MEETING

**MEETING SUMMARY**

**JULY 19, 2006**

**9:00 A.M. – 12:00 P.M.**

An air quality scoping meeting was conducted on Wednesday, July 19, 2006, at the offices of the Ohio Environmental Protection Agency (OEPA) in Columbus, Ohio. The purpose of the meeting was to initiate contact and gather information from the U.S. Environmental Protection Agency (USEPA), OEPA, and local air quality agencies concerned with the air quality assessment that is being prepared as part of the Federal Aviation Administration (FAA) Environmental Impact Statement for the Port Columbus International Airport (CMH EIS).

**Introduction**

Attending the meeting were representatives of the Columbus Regional Airport Authority (CRAA), the USEPA Region 5 (Chicago), OEPA, the Mid-Ohio Regional Planning Commission (MORPC), Gresham, Smith, and Partners (consultants), and Landrum and Brown, the FAA contractor for the CMH EIS. A list of attendees is attached following the minutes of the meeting.

The meeting discussion focused on the air quality regulatory requirements, modeling approach, data requirements, and conformity issues unique to airport improvement projects. A meeting agenda and discussion outline were distributed to the meeting participants in advance of the meeting. The meeting discussion was guided through the use of a Power Point presentation, and a copy of the presentation was provided to each participant at the beginning of the meeting.

**Summary Notes from the July 19, 2006 Meeting**

The meeting was opened at 9:00 a.m. by Mr. Rob Adams, the Project Manager for Landrum & Brown. Following introductions of the participants, the meeting was led by Ms. Virginia Raps, the Air Quality Manager for Landrum & Brown. Ms. Raps noted that the information presented at this meeting should not be considered the final authority for assessing air quality for either the Draft CMH EIS or the Final CMH EIS as there may be changes in procedure recommended by the participants, and there may be changes in the project during the planning process.

Ms. Raps provided a brief overview of the air quality status of Franklin County, which is nonattainment for the eight-hour ozone standard and nonattainment for emissions of fine particulate matter ($PM_{2.5}$). The county is attainment for the remaining criteria pollutants. Ms. Raps explained the purpose of air quality scoping is to work toward a consensus with regard to the procedure and methodology used to prepare the air quality assessment for the CMH EIS, particularly with respect to the requirements of the Ohio State Implementation Plan (SIP).

Sponsor's Proposed Project

A brief description of the Sponsor's Proposed Project was provided, which includes the replacement of Runway 10R/28L, and relocation of the runway 702 feet south of the existing Runway 10R/28L, including the necessary associated taxiways. The project includes additional terminal development for the airport, and the possibility of the realignment of Stelzer Road at the end of Runway 10R.



*Federal Aviation Administration*

ENVIRONMENTAL IMPACT STATEMENT

FOR

REPLACEMENT RUNWAY AND TERMINAL EXPANSION

AT

PORT COLUMBUS INTERNATIONAL AIRPORT

AIR QUALITY SCOPING MEETING

MEETING SUMMARY

JULY 19, 2006

9:00 A.M. – 12:00 P.M.

At this time, the Proposed Project also includes the installation of navigational aides. The alternatives analysis has not been completed and it is not yet known whether a preferred project alternative will be identified in the Draft EIS or the Final EIS.

National Environmental Policy Act (NEPA) Requirements

Ms. Raps explained the objective of an airport air quality assessment, which is to satisfy the requirements of Clean Air Act (CAA) Section 176(c)(1). Compliance with the CAA may include dispersion analysis to evaluate the air quality impacts under the proposed alternatives. The FAA established screening criteria to address the need for dispersion analysis for airport projects. The criteria relate the annual passengers served at the airport to the number of annual operations of general aviation (GA) and air taxi aircraft.

The criteria require an airport that services more than 2.6 million annual passengers or accommodates more than 180,000 combined GA and air taxi aircraft operations to conduct dispersion analysis for comparison to the NAAQS. Preliminary data indicate that CMH serves 6.6 million passengers each year. Consequently, regardless of the number of GA and air taxi operations, ***dispersion analysis to determine compliance to the NAAQS would be required for this project.*** Dispersion analysis would be conducted for the cases given in **Table 1**.

**Table 1**

| YEAR | PURPOSE | REMARKS |
|---|---|---|
| 2006/2007 | Existing conditions | Supports NAAQS comparison analysis for dispersion required under NEPA |
| 2012 | Baseline conditions | Runway build-out year |
| 2012 | All EIS project alternatives | Proposed Project cases for the build-out year for the new runway |
| 2018 | Baseline conditions | Terminal build-out year |
| 2018 | All EIS project alternatives | Proposed Project cases for the build-out year for the new terminal |

Note: NAAQS is National Ambient Air Quality Standards

Clean Air Act General Conformity Rule

A Federal action is applicable under the general conformity regulations when the action is:

- Federally-funded or approved, and
- Not a highway or transit project, and
- Not exempt or presumed to conform, and,
- Located within a nonattainment area.




**_Federal Aviation Administration_**

**ENVIRONMENTAL IMPACT STATEMENT**

**FOR**

**REPLACEMENT RUNWAY AND TERMINAL EXPANSION**

**AT**

**PORT COLUMBUS INTERNATIONAL AIRPORT**

**AIR QUALITY SCOPING MEETING**

**MEETING SUMMARY**

**JULY 19, 2006**

**9:00 A.M. – 12:00 P.M.**


Ms. Raps explained that because Franklin County is located within a nonattainment area for ozone and $PM_{2.5}$, and as all the other requirements under general conformity would be met, ***the Proposed Project is subject to the General Conformity Rule.*** As such, the net emissions due to the Proposed Project may not equal or exceed the "de minimis" thresholds for the pollutants of concern in Franklin County ($NO_x$, VOC, $SO_x$, and $PM_{2.5}$), which are 100 tons per year, for each pollutant. Consequently, emissions inventories would be required for the years shown in **Table 2**.

**Table 2**

| YEAR | REQUIRING AGENCY | PURPOSE | REMARKS |
|---|---|---|---|
| 2006/2007 | FAA | Existing conditions | Supports NAAQS comparison analysis for dispersion required under NEPA |
| 2010 | USEPA | General Conformity | Pursuant to 40 CFR 93.158, CAA mandated ozone attainment year |
| TBD | USEPA | General Conformity | Year of greatest project emissions, most likely a construction year |
| 2012 | FAA | Baseline conditions | Runway build-out year |
| 2012 | FAA | Preferred Project alternative, if declared | Build-out year for the new runway |
| 2018 | FAA | Baseline conditions | Terminal build-out year |
| | USEPA | General Conformity | SIP emissions budget year |
| 2018 | FAA | Proposed Project alternative, if declared | Build-out year for the new terminal |
| | USEPA | General Conformity | SIP emissions budget year |

Note: NAAQS is National Ambient Air Quality Standards.
TBD is "to be determined."

## *Federal Aviation Administration*

**ENVIRONMENTAL IMPACT STATEMENT**

**FOR**

**REPLACEMENT RUNWAY AND TERMINAL EXPANSION**

**AT**

**PORT COLUMBUS INTERNATIONAL AIRPORT**

**AIR QUALITY SCOPING MEETING**

**MEETING SUMMARY**

**JULY 19, 2006**

**9:00 A.M. – 12:00 P.M.**

The primary source of guidance for the air quality analysis would be Appendix W of 40 CFR Part 51, *Guideline for Air Quality Models*, and the FAA *Air Quality Handbook* (Air Quality Procedures for Civilian Airports and Air Force Bases).

Modeling Approach

It was noted that the example tables and charts given in the Power Point presentation were provided only as examples for instruction, and would not represent data specific to CMH, the CMH EIS, or to any airport in particular.

Ms. Raps described the pollutants that will be considered in the analysis and the computer models that will be used for the emissions inventories and the dispersion analyses.

- FAA Emissions and Dispersion Model (EDMS) will be used to estimate emissions of the criteria and precursor pollutants, and will be used to conduct the dispersion analysis of criteria pollutants only
- MOBILE 6 modeling will be used to calculate the emission factors used in EDMS for on-road motor vehicles



*Federal Aviation Administration*

ENVIRONMENTAL IMPACT STATEMENT

FOR

REPLACEMENT RUNWAY AND TERMINAL EXPANSION

AT

PORT COLUMBUS INTERNATIONAL AIRPORT

AIR QUALITY SCOPING MEETING

MEETING SUMMARY

JULY 19, 2006

9:00 A.M. – 12:00 P.M.

- NONROAD emission factors will be used to supplement data not applicable for non-road diesel engines not provided in 40 CFR Part 89
- Construction equipment emissions inventory will be prepared using a computer spreadsheet

Emissions Sources

The emissions inventory and dispersion analysis will include an evaluation of aircraft engines, ground support equipment (GSE), auxiliary power units (APUs), on-road motor vehicles in parking lots/garages, and stationary sources. Each of these sources was explained in detail, including a discussion of how aircraft will be modeled, and how on-site surveys were conducted for GSE use and for operational characteristics of stationary sources.

During the presentation Ms. Raps proposed the 2004 stationary emissions inventory prepared by Gresham Smith & Partners and Environmental Quality Management (EQM) be used for the emissions inventory. The meeting participants agreed the inventory would be used in the emissions inventory analysis but data for the larger sources would be updated for inclusion in the dispersion analysis. The larger sources include terminal boilers, terminal emergency generators, the airport incinerator, and deicing equipment.

Emissions Inventory

Ms. Raps described the procedure for calculating net emissions from the emission inventories. The emissions inventory requires the input of the average annual temperature and the average annual mixing height. Preliminary research indicates that the average annual temperature at Columbus is 52.9 degrees Fahrenheit; and the average annual mixing height is 3,052 feet above ground level. The procedure for calculating the construction equipment emissions inventory was explained.

Dispersion Modeling

The dispersion analysis would be based on the criteria pollutant inventory prepared using EDMS. It was requested by Ms. Suzanne King, USEPA Region 5, that an evaluation of five years of weather data be used for the dispersion modeling instead of one year of data proposed in the presentation and in the project's scope of work. Ms. King was asked to provide this request in written form to Ms. Katherine Jones, FAA Project Manager, as this request requires a change to the EIS scope of work and requires approval from FAA.

Ms. Raps explained how receptor locations would be identified for the EDMS dispersion analysis. Receptors will be placed every 10 degrees along the airport property line, as measured from the airport reference point (ARP) given on the digital computer design drawing of the CMH existing airfield. Two additional rings of receptors, spaced 500 feet apart, will also be established. In addition, up to five receptors will be placed in sensitive neighborhoods or public areas surrounding the airport, and a closer-spaced grid of receptors will be established along the terminal curb. A maximum of 143 receptors will





be applied to dispersion modeling under the 2006/2007 Existing Conditions. Based on the results of the baseline analysis, and following further agency coordination, 10 receptors locations will be selected for analysis for all the future baseline and project alternative analyses presented in the Draft EIS. For the Final EIS, five receptor locations will be applied to all the future baseline and project alternative analyses, following further consultation through agency coordination.

Background concentrations for the criteria pollutants are required to calculate the "design concentrations" for comparison to the NAAQS. Mr. Bill Spires indicated that Ms. Sarah Hedlund, OEPA, would provide the existing and future background concentrations necessary for the analysis.

Ms. Raps explained how the results of dispersion modeling would be interpreted for three specific scenarios, (1) when the design concentration is greater than the USEPA standard under the future baseline, decreasing with the Proposed Project to a level still exceeding the USEPA standard – this scenario would be compliant; (2) when the design concentration is less than the USEPA standard under the future baseline, increasing with the Proposed Project to a level still below the USEPA standard – this scenario would be compliant; and, (3) when the design concentration is less than the USEPA standard under the future baseline, increasing to equal or exceed the USEPA standard under the Proposed Project – this scenario would not be compliant to the NAAQS. Mr. Bill Spires, OEPA, concurred with this interpretation of dispersion results.

Mr. Spires also requested the document report the highest concentration per pollutant per case for the dispersion analysis as opposed to the "highest, second highest" value.

Data Requirements

Throughout the discussion, the participants offered contact information for the provision of specific data required to assess air quality; some of the data was supplied during the discussion. A summary of the data requirements, the assigned contact person and the date by which the data should be provided, is given in **Table 3**. All data that was requested in electronic format should be forwarded to the offices of Landrum & Brown; other data should be provided in written form through e-mail to:

Ms. Virginia Raps
Landrum & Brown Air Quality Manager
graps@landrum-brown.com
513-530-1238

***All data requested at this meeting should be provided as directed above no later than October 1, 2006.***





**Table 3**

| DATA REQUIREMENT AND COORDINATION | CONTACT PERSON/AGENCY | ANALYSIS TYPE AND YEAR | DATE REQUIRED |
|---|---|---|---|
| Digital airport layout | Rob Adams Landrum & Brown | Dispersion analysis | Landrum & Brown has these files |
| Mobile 6.2 files, both input and output files, in digital format | Chris Gawronski MORPC | Emissions inventory and dispersion analysis | 10/01/06 |
| Written request for the use of five years of meteorology | Suzanne King USEPA, Region 5 | Dispersion analysis | Provide written comment no later than 8/19/2006 |
| Background Concentrations for all criteria pollutants for 2006, 2012, and 2018, provided in written form | Sarah Hedlund OEPA | Dispersion analysis | 10/01/06 |
| State implementation plan milestone years | Bill Spires OEPA | General Conformity Evaluation | Provided at the meeting |
| State Implementation Plan Emissions Budgets | Bill Spires OEPA | General Conformity Evaluation | Provided at the meeting |

Note: MORPC is Mid-Ohio Regional Planning Commissions.
TBD is "to be determined."

### Next Steps

Agency comments regarding the CMH EIS, and comments or requests relating to this scoping meeting should be provided ***in writing to the FAA no later than August 19, 2006***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road, Suite 107
Romulus, Michigan 48174
Email:CMHEIS@FAA.GOV.

### Meeting Participants

The following is a list of the meeting participants, which contributed to the meeting either in person, or through teleconferencing. ***All participants should review the list and confirm the accuracy of their contact information, noting areas where information is requested.*** This information will ensure notification of follow-up coordination.



**_Federal Aviation Administration_**

**ENVIRONMENTAL IMPACT STATEMENT**

**FOR**

**REPLACEMENT RUNWAY AND TERMINAL EXPANSION**

**AT**

**PORT COLUMBUS INTERNATIONAL AIRPORT**

**AIR QUALITY SCOPING MEETING**

**MEETING SUMMARY**

**JULY 19, 2006**

**9:00 A.M. – 12:00 P.M.**

| | |
|---|---|
| **Name:** | Ms. Virginia L. Raps |
| **Title:** | Air Quality Manager |
| **Agency/Division/Firm** | Landrum & Brown |
| **Mailing Address** | 11279 Cornell Park Drive<br>Cincinnati, OH 45242 |
| **E-mail Address:** | graps@landrum-brown.com |
| **Telephone Number:** | 513-530-1238 |
| **FAX Number:** | 513-530-1278 |
| **Name:** | Mr. Kelly Kaletsky |
| **Title:** | Environmental Coordinator |
| **Agency/Division/Firm** | Columbus Regional Airport Authority (CRAA) |
| **Mailing Address** | 4600 International Gateway<br>Columbus, OH 43219 |
| **E-mail Address:** | kkaletsky@ColumbusAirports.com |
| **Telephone Number:** | 614-239-3015 |
| **FAX Number:** | 614-239-3183 |

## AIR QUALITY SCOPING MEETING

**MEETING SUMMARY**
**JULY 19, 2006**
**9:00 A.M. – 12:00 P.M.**

| | |
|---|---|
| **Name:** | Ms. Sarah Hedlund |
| **Title:** | Meteorologist, Division of Air Pollution Control, SIP Section |
| **Agency/Division/Firm** | OEPA |
| **Mailing Address** | 122 South Front Street<br>Columbus, OH 43215 |
| **E-mail Address:** | sarah.hedlund@epa.state.oh.us |
| **Telephone Number:** | 614-644-8682 |
| **FAX Number:** | 614-644-8681 |
| **Name:** | Mr. Rob Adams |
| **Title:** | Senior Project Manager |
| **Agency/Division/Firm** | Landrum & Brown |
| **Mailing Address** | 11279 Cornell Park Drive<br>Cincinnati, OH 45242 |
| **E-mail Address:** | radams@landrum-brown.com |
| **Telephone Number:** | 513-530-1201 |
| **FAX Number:** | 513-530-1278 |




**_Federal Aviation Administration_**

**ENVIRONMENTAL IMPACT STATEMENT**
**FOR**
**REPLACEMENT RUNWAY AND TERMINAL EXPANSION**
**AT**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

## AIR QUALITY SCOPING MEETING

**MEETING SUMMARY**
**JULY 19, 2006**
**9:00 A.M. – 12:00 P.M.**


| | |
|---|---|
| **Name:** | Mr. Christopher Gawronski |
| **Title:** | Principal Planner |
| **Agency/Division/Firm** | Mid-Ohio Regional Planning Commission (MORPC) |
| **Mailing Address** | 285 East Main Street<br>Columbus, OH 43215 |
| **E-mail Address:** | cgawronski@morpc.org |
| **Telephone Number:** | 614-233-4166 |
| **FAX Number:** | 614-621-2401 |
| **Name:** | Mr. Tom Velalis |
| **Title:** | Supervisor, Emission Inventory unit |
| **Agency/Division/Firm** | OEPA |
| **Mailing Address** | 122 South Front Street<br>Columbus, OH 43215 |
| **E-mail Address:** | tom.velalis@epa.state.oh.us |
| **Telephone Number:** | 614-644-4837 |
| **FAX Number:** | ***Please Provide Information*** |

| | |
|---|---|
| **Name:** | Ms. Sam MacDonald |
| **Title:** | ESII - Conformity Issues |
| **Agency/Division/Firm** | OEPA Division of Air Pollution Control |
| **Mailing Address** | 122 South Front Street<br>Columbus, OH 43215 |
| **E-mail Address:** | sam.macdonald@epa.state.oh.us |
| **Telephone Number:** | ***Please provide information*** |
| **FAX Number:** | 614-728-1743 |
| **Name:** | Mr. William Nichols |
| **Title:** | ESII |
| **Agency/Division/Firm** | OEPA Division of Air Pollution Control |
| **Mailing Address** | 122 South Front Street<br>Columbus, OH 43215 |
| **E-mail Address:** | william.nichols@epa.state.oh.us |
| **Telephone Number:** | 614-644-3612 |
| **FAX Number:** | 614-728-1743 |





| | |
|---|---|
| **Name:** | Mr. Paul Kennedy |
| **Title:** | Supervisor, Environmental, Safety & Health |
| **Agency/Division/Firm** | Columbus Regional Airport Authority (CRAA) |
| **Mailing Address** | 4600 International Gateway<br>Columbus, OH 43219 |
| **E-mail Address:** | pkennedy@ColumbusAirports.com |
| **Telephone Number:** | 614-239-3347 |
| **FAX Number:** | 614-239-3183 |
| **Name:** | Mr. Bill Spires, C.C.M. |
| **Title:** | Meteorologist |
| **Agency/Division/Firm** | OEPA Division of Air Pollution Control |
| **Mailing Address** | 122 South Front Street<br>Columbus, OH 43215 |
| **E-mail Address:** | bill.spires@epa.state.oh.us |
| **Telephone Number:** | 614-644-3618 |
| **FAX Number:** | 614-644-8681 |

| | |
|---|---|
| **Name:** | Mr. David Wall, A.A.E. |
| **Title:** | Capital Program Manager |
| **Agency/Division/Firm** | Columbus Regional Airport Authority (CRAA) |
| **Mailing Address** | 4600 International Gateway<br>Columbus, OH 43219 |
| **E-mail Address:** | dwall@ColumbusAirports.com |
| **Telephone Number:** | 614-239-4063 |
| **FAX Number:** | 614-238-7850 |

| | |
|---|---|
| **Name:** | Mr. Bernard Meleski |
| **Title:** | Director, Planning & Development |
| **Agency/Division/Firm** | Columbus Regional Airport Authority (CRAA) |
| **Mailing Address** | 4600 International Gateway<br>Columbus, OH 43219 |
| **E-mail Address:** | bmeleski@ColumbusAirports.com |
| **Telephone Number:** | 614-239-4042 |
| **FAX Number:** | 614-238-7850 |



*Federal Aviation Administration*

ENVIRONMENTAL IMPACT STATEMENT
FOR
REPLACEMENT RUNWAY AND TERMINAL EXPANSION
AT
PORT COLUMBUS INTERNATIONAL AIRPORT

AIR QUALITY SCOPING MEETING

MEETING SUMMARY
JULY 19, 2006
9:00 A.M. – 12:00 P.M.

| | |
|---|---|
| **Name:** | Ms. Sarah Potter |
| **Title:** | Consultant |
| **Agency/Division/Firm** | Landrum & Brown |
| **Mailing Address** | 11279 Cornell Park Drive<br>Cincinnati, OH 45242 |
| **E-mail Address:** | spotter@landrum-brown.com |
| **Telephone Number:** | 513-530-1271 |
| **FAX Number:** | 513-530-1278 |

| | |
|---|---|
| **Name:** | Ms. Patricia Morris *(teleconference participant)* |
| **Title:** | Environmental Scientist |
| **Agency/Division/Firm** | USEPA Region 5 |
| **Mailing Address** | 77 W. Jackson Blvd.<br>Chicago, IL 60604 |
| **E-mail Address:** | Morris.Patricia@epamail.epa.gov |
| **Telephone Number:** | 312-353-8656 |
| **FAX Number:** | 312-886-5824 |

***Federal Aviation Administration***

## ENVIRONMENTAL IMPACT STATEMENT

FOR

## REPLACEMENT RUNWAY AND TERMINAL EXPANSION

AT

## PORT COLUMBUS INTERNATIONAL AIRPORT

### AIR QUALITY SCOPING MEETING

**MEETING SUMMARY**

**JULY 19, 2006**

**9:00 A.M. – 12:00 P.M.**

| | |
|---|---|
| **Name:** | Mr. Tim Arendt *(teleconference participant)* |
| **Title:** | Associate |
| **Agency/Division/Firm** | Gresham, Smith, and Partners |
| **Mailing Address** | 580 North 4th Street<br>Columbus, OH 43215 |
| **E-mail Address:** | tim_arendt@gspnet.com |
| **Telephone Number:** | 614-221-0678 |
| **FAX Number:** | 614-221-7329 |

| | |
|---|---|
| **Name:** | Ms. Jill Foster *(teleconference participant)* |
| **Title:** | Associate |
| **Agency/Division/Firm** | Gresham, Smith, and Partners |
| **Mailing Address** | 580 North 4th Street<br>Columbus, OH 43215 |
| **E-mail Address:** | jill_foster@gspnet.com |
| **Telephone Number:** | 614-221-0678 |
| **FAX Number:** | 614-221-7329 |



***Federal Aviation Administration***

ENVIRONMENTAL IMPACT STATEMENT

FOR

REPLACEMENT RUNWAY AND TERMINAL EXPANSION

AT

PORT COLUMBUS INTERNATIONAL AIRPORT

AIR QUALITY SCOPING MEETING

MEETING SUMMARY

JULY 19, 2006

9:00 A.M. – 12:00 P.M.

| | |
|---|---|
| **Name:** | Ms. Suzanne King *(teleconference participant)* |
| **Title:** | ***Please provide information*** |
| **Agency/Division/Firm** | USEPA Region 5, Air Radiation Division |
| **Mailing Address** | 77 W. Jackson Blvd.<br>Chicago, IL 60604 |
| **E-mail Address:** | King.Suzanne@epamail.epa.gov |
| **Telephone Number:** | 312-886-6054 |
| **FAX Number:** | 312-886-0617 |

## Comments on the Port Columbus International Airport EIS Air Dispersion Modeling from the Ohio EPA

Landrum & Brown, contracted by the Federal Aviation Administration (FAA) for the Port Columbus International Airport EIS, has proposed to use one year of meteorological data for air dispersion modeling. Appendix W of The Code of Federal Regulations states that although only one year of site specific data is required, if more site specific data is available it also should be used in the air dispersion model input. The Ohio EPA requests that all five years of meteorological data be used in the model input to ensure that all worst case meteorological scenarios are represented.

Landrum & Brown has also proposed the idea of limiting the number of receptors to five discrete receptors placed in critical areas for the future baseline and alternative model runs. Receptors analyzed in the Final EIS will be chosen based on the results from the Existing Conditions model run. The Ohio EPA requests that the number of receptors to be included in the Final EIS not be determined until after the Existing Conditions concentrations are reviewed. The results of the dispersion assessment provided in the Draft EIS should determine how many receptors should be retained. The location of these receptors should be based on the number of hot spots, the location of any special 'sensitive' receptors and the gradient of the concentration. These locations can not be predetermined. Fenceline receptors may be included in the receptor locations the Ohio EPA requests to be further analyzed. The Ohio EPA will work in coordination with Landrum & Brown to determine the location and number of receptors that should be included in the Final EIS.

The above requests made by the Ohio EPA are similar to those made by USEPA on other airport projects in Regions III, IV, and V.

**USEPA Region 5 Comments on the Port Columbus International Airport EIS Air Quality Scoping Document (July 19, 2006)**

The scoping information presented to date for the Columbus Airport EIS work proposes the use of one year of meteorological data as input into the EDMS dispersion model. The purpose of the dispersion modeling is to determine compliance with EPA's National Ambient Air Quality Standards (NAAQS). The Code of Federal Regulations, Part 51, Appendix W (Guideline on Air Quality Models) provides recommended approaches for regulatory modeling conducted to demonstrate compliance with the NAAQS. Section 8.3 of the Guideline discusses the need for meteorological data to be selected on the basis of spatial and temporal representativeness and further recommends five years of meteorological data be used to reasonably ensure that worst-case meteorological conditions are adequately represented in the model results. If the only representative data available is one-year of site-specific data, or if site-specific meteorological data needs to be collected, one year is adequate. However, if more than one year, up to 5 years, is available, these data are recommended for use. Given these Guideline recommendations, EPA requests that 5-years of meteorological data be evaluated in the EIS NAAQS modeling analysis to account for year-to-year variability.

Also, the approach described for identifying and eliminating modeling receptors should be more fully discussed as the modeling progresses. The "Guideline" describes the receptor grid as being in sufficient detail to estimate the highest concentrations and possible violations of the NAAQS. The general approach of beginning with a large grid and refining it to a smaller number of receptors focused on the highest concentration areas is appropriate. However, the final number of receptors that will be needed cannot be predetermined but rather should be a function of what the large grid results show as well as the mix of future source emissions and scenarios.
(EPA Region 5 contact: Randy Robinson, 312-353-6713)

Regarding emissions from construction activity, air pollution from diesel exhaust is a public health and air quality concern. EPA lists diesel exhaust (best described by diesel PM) as a mobile source air toxic due to the cancer and noncancer health effects. A number of large construction projects (including highways and airports) recently have required diesel exhaust reduction measures in the construction specifications and we request/encourage all bidding and contract documents for the Columbus airport construction include requirements for fuel and equipment that would reduce emissions of diesel particulate matter. Diesel-powered construction equipment should be required to utilize "ultra-low sulfur diesel" (ULSD) fuel. In addition, all but the newest equipment should be retrofitted with EPA-verified technologies, e.g., oxidation catalysts or particulate filters. Contractors, subcontractors and suppliers that transport materials regularly to and from the project site should be encouraged to adopt these requirements to the best of their ability. Idling restrictions should also be built into the construction-related air quality emission reduction measures.

USEPA has case studies, listings of EPA-verified technologies, and helpful examples of contract language and specifications (including those for the O'Hare Airport

Modernization Project). Staff at the USEPA Region 5 Air & Radiation Division can provide this information or you can find it at:
http://www.epa.gov/cleandiesel/construction/ and
http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm

(EPA Region 5 contact: Suzanne King, 312-886-6054, king.suzanne@epa.gov; Julie Magee 312-886-6063, magee.julie@epa.gov))

# AIR QUALITY COORDINATION MEETING
## June 19, 2007
## Columbus, Ohio

**Agenda**
**Registration**
**Discussion Outline**
**Meeting Minutes**
**Revised Discussion Outline**

## PORT COLUMBUS INTERNATIONAL AIRPORT
## ENVIRONMENTAL IMPACT STATEMENT

**Federal Aviation Administration**

**AIR QUALITY SCOPING MEETING**

**Tuesday June 19, 2007**
**9:00 a.m. to 12:00 noon EDT**
**6th Floor, Conference Room B**

**Ohio EPA Central Office**
**122 South Front Street**
**Columbus, OH 43216**

# AGENDA

*Welcome* .................................. *Rob Adams, Landrum & Brown Project Manager*

*I. Introduction* .......................................... *Virginia Raps, Landrum & Brown*

*II. Proposed Project* .................................................................. *Discussion*

*III. Ohio SIP for Franklin County* .................................................. *Discussion*

*IV. Regulatory Thresholds* ........................................................... *Discussion*

*V. Meteorology* ........................................................................... *Discussion*

*VI. Emission Sources* .................................................................. *Discussion*

*VII. Dispersion Analysis* .............................................................. *Discussion*

*VIII. Construction* ........................................................................ *Discussion*

*IX. Outstanding Data Needs* ........................................................ *Discussion*

* * * * *

**AGENCY CONTACT:** Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174
**Email:** CMHEIS@FAA.GOV
**Website:** www.Airportsites.net/CMH-EIS

# SIGN-IN SHEET

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Draft Environmental Impact Statement

**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Tuesday, June 19, 2007, 9:00 a.m. EDT**

| | |
|---|---|
| NAME (Please Print) | BILL SPIRES |
| TITLE | MGR. SIP SECTION |
| AGENCY / DIVISION / FIRM | OHIO EPA / DAPC |
| MAILING ADDRESS | 50 W. TOWN ST<br>COL OH 43215 |
| E-MAIL ADDRESS | BILL.SPIRES @ EPA.STATE.OH.US |
| TELEPHONE NUMBER | 614-644-3618 |
| FAX NUMBER | 614-644-3681 |

| | |
|---|---|
| NAME (Please Print) | SAm MacDonald (Miss) |
| TITLE | Environmental Specialist 2 |
| AGENCY / DIVISION / FIRM | Ohio EPA / DAPC |
| MAILING ADDRESS | 50 W. Town St<br>Columbus OH 43215 |
| E-MAIL ADDRESS | sam.macdonald@epa.state.oh.us |
| TELEPHONE NUMBER | (614) 728-1743 |
| FAX NUMBER | (614) 644-3681 |

| | |
|---|---|
| NAME (Please Print) | BERNIE MELESKI |
| TITLE | DIRECTOR, AIRPORT PLANNING |
| AGENCY / DIVISION / FIRM | COLUMBUS REGIONAL AIRPORT AUTHORITY |
| MAILING ADDRESS | 4600 INTERNATIONAL GATEWAY<br>COLUMBUS, OH 43219 |
| E-MAIL ADDRESS | BMELESKI@COLUMBUSAIRPORTS.COM |
| TELEPHONE NUMBER | (614) 239-4042 |
| FAX NUMBER | (614) 238-7850 |

# SIGN-IN SHEET

**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Tuesday, June 19, 2007, 9:00 a.m. EDT**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Draft Environmental Impact Statement

| | |
|---|---|
| NAME (Please Print) | Virginia Raps |
| TITLE | Air Quality Manager - CMH EIS |
| AGENCY / DIVISION / FIRM | Landrum-Brown |
| MAILING ADDRESS | 11279 Cornell Park Dr.<br>Cincinnati, OH 45242 |
| E-MAIL ADDRESS | graps@landrum-brown.com |
| TELEPHONE NUMBER | 513-530-1238 or 937-218-0053 |
| FAX NUMBER | 513-530-2238 |

| | |
|---|---|
| NAME (Please Print) | Rob Adams |
| TITLE | Managing Director - L+B project mgr |
| AGENCY / DIVISION / FIRM | Landrum + Brown |
| MAILING ADDRESS | 11279 Cornell Park Dr.<br>Cincinnati, OH 45242 |
| E-MAIL ADDRESS | radams@landrum-brown.com |
| TELEPHONE NUMBER | 513-530-1201 |
| FAX NUMBER | 513-530-2201 |

| | |
|---|---|
| NAME (Please Print) | Sarah Hedlund |
| TITLE | Air Quality Modeler |
| AGENCY / DIVISION / FIRM | OEPA |
| MAILING ADDRESS | 50 W. Town St Ste 700<br>Columbus, Ohio 43215 |
| E-MAIL ADDRESS | Sarah.hedlund@epa.state.oh.us |
| TELEPHONE NUMBER | 614-644-3632 |
| FAX NUMBER | 614-644-3681 |

# SIGN-IN SHEET

**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Tuesday, June 19, 2007, 9:00 a.m. EDT**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Draft Environmental Impact Statement

| | |
|---|---|
| NAME (Please Print) | Paul Kennedy |
| TITLE | ES&H Supervisor |
| AGENCY / DIVISION / FIRM | Columbus Regional Airport Authority |
| MAILING ADDRESS | 4600 International Gateway<br>Columbus OH 43219 |
| E-MAIL ADDRESS | pkennedy@columbusairports.com |
| TELEPHONE NUMBER | 614 239 3347 |
| FAX NUMBER | |

| | |
|---|---|
| NAME (Please Print) | Chris Gawronski |
| TITLE | Principal Planner |
| AGENCY / DIVISION / FIRM | MORPC |
| MAILING ADDRESS | (Same as last mtg) |
| E-MAIL ADDRESS | |
| TELEPHONE NUMBER | |
| FAX NUMBER | |

| | |
|---|---|
| NAME (Please Print) | Dave Wall |
| TITLE | Same as last |
| AGENCY / DIVISION / FIRM | |
| MAILING ADDRESS | |
| E-MAIL ADDRESS | |
| TELEPHONE NUMBER | |
| FAX NUMBER | |

# SIGN-IN SHEET

**AIR QUALITY SCOPING MEETING**
Ohio EPA
Columbus, Ohio
**Tuesday, June 19, 2007, 9:00 a.m. EDT**

**FEDERAL AVIATION ADMINISTRATION**

Port Columbus International Airport
Draft Environmental Impact Statement

| | |
|---|---|
| NAME (Please Print) | Bernie M. |
| TITLE | Same as last meeting |
| AGENCY / DIVISION / FIRM | |
| MAILING ADDRESS | |
| E-MAIL ADDRESS | |
| TELEPHONE NUMBER | |
| FAX NUMBER | |

| | |
|---|---|
| NAME (Please Print) | Suzanne King |
| TITLE | no chg |
| AGENCY / DIVISION / FIRM | |
| MAILING ADDRESS | |
| E-MAIL ADDRESS | |
| TELEPHONE NUMBER | |
| FAX NUMBER | |

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| MAILING ADDRESS | | |
| E-MAIL ADDRESS | | |
| TELEPHONE NUMBER | | |
| FAX NUMBER | | |



**Port Columbus**
**International Airport**
**Environmental Impact Statement**

# Discussion Outline

## Air Quality Scoping Meeting

Location: Ohio Environmental Protection Agency (OEPA)
6th Floor, Conference Room "B"
122 South Front Street
Columbus, OH 43216

Date: Tuesday, June 19, 2007
Time: 9:00 a.m. – 12:00 noon EDT

**Prepared for:**

Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Romulus, Michigan 48174

**Prepared by:**

Landrum&Brown
Since 1949

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# I. INTRODUCTION

The Federal Aviation Administration (FAA) is preparing an Environmental Impact Statement for the Port Columbus International Airport (CMH EIS or airport). As the airport sponsor, the Columbus Regional Airport Authority (CRAA) proposes a Federal action to replace Runway 10R/28L with a new runway of approximately the same length. The new runway is proposed to be relocated south of the existing Runway 10R/28L to allow for passenger terminal expansion that will accommodate future aviation demand at the airport. At this time, the FAA intends to include a review of air quality impacts in the CMH EIS under the following cases:

- 2006 Existing Conditions
- 2009 Project for SIP eight-hour ozone attainment year, inventory only[1]
- 2010 Project for SIP one-hour ozone budget (milestone) year, inventory only[1]
- 2012 Baseline
- 2012 Project Alternatives
- 2018 Baseline
- 2018 Project Alternatives

This air quality scoping meeting continues the process of engaging the participation of the Federal, State, and local air quality agencies concerned with the thorough assessment of air quality impacts for the CMH EIS. The coordination effort will be documented in a Draft Air Quality Approach Technical Report, which will be included in the Draft EIS during the public comment period.

The goal of this air quality scoping meeting is to:

- Confirm the requirements for analysis relating to the provisions of the SIP
- Obtain concurrence on data development, procedures, and methodology planned for computer modeling
- Determine whether there are any outstanding data required for the modeling effort

[1] The first year of proposed project implementation is not until 2012. However, construction is anticipated to begin in 2009. Therefore, the 2009 and 2010 emission inventories would include estimated construction emissions.

The objective of this air quality scoping meeting is to engage the participants in a general discussion of:

- Proposed Project
- Ohio State Implementation Plan (SIP) for Franklin County
- Applicable regulatory thresholds
- Meteorology used for the emission inventory and dispersion modeling
- Overview of emission sources
- Overview of dispersion analysis
- Procedure for the construction emissions inventory
- Identification of any outstanding data needs

## II. PROPOSED PROJECT

The airport currently has a set of parallel runways as shown in the photograph in Figure 1. The shorter Runway 10L/28R, located north of the passenger terminal area, is 8,000 feet long. The longer Runway 10R/28L is located south of the terminal core and is 10,125 feet long.


**FIGURE 1.** Aerial photograph of CMH showing the existing runways, the approximate location of the replacement runway (dotted line), and the orientation to north.







The proposed project includes:

- Relocation of Runway 10R/28L to the south
- Construction of additional taxiways to support the replacement runway
- Installation of navigational aids (NAVAIDS)
- Terminal development
- Roadway improvements in the terminal core
- Parking facility improvements
- Development of air traffic operational procedures for the replacement runway
- Proposed Part 150 noise abatement actions to be implemented upon receipt of the Record of Approval.

## III. OHIO SIP

The Ohio SIP is included in the Ohio Administrative Code,[2] (OAC) Chapter 3745, which incorporates, by reference, the requirements under the National Environmental Policy Act (NEPA)[3] and the provisions of the Clean Air Act, including the 1990 Amendments (CAA).[4] According to the Ohio SIP, Franklin County is designated nonattainment for ozone and fine particulate matter ($PM_{2.5}$). Two documents were referenced for information regarding the expected attainment years in Franklin County, and the emission budgets for the milestone years:

- Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the Franklin, Delaware, Licking, Fairfield, Madison, and Knox County Ozone Non-Attainment Area, prepared by the Mid-Ohio Regional Planning Commission (MORPC), dated April 28, 2005, referred to in this document as the Ozone Determination.

- Central Ohio PM2.5 Air Quality Analysis: Air Quality Conformity Determination Documentation for the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County PM2.5 Non-Attainment Area, prepared by MORPC, dated February 9, 2006, referred to in this document as the $PM_{2.5}$ Determination.

[2] Ohio Administrative Code (OAC) Chapter 3745-21-02 *Ambient Air Quality Standards and Guidelines*, November 5, 2002 available on the Internet at http://onlinedocs.andersonpublishing.com/oh /lpExt.dll?f=templates&fn=main-h.htm&cp=PORC.

[3] Ohio Administrative Code (FAC), Chapter 62-204.800, *Federal Regulations Adopted by Reference*, incorporated the NAAQS into the Ohio SIP.

[4] Ohio Administrative Code (OAC) Chapter 3745-101-20 *Savings Provisions*, December 31, 2004, available on the Internet at http://onlinedocs.andersonpublishing.com/oh /lpExt.dll?f=templates&fn=main-h.htm&cp=PORC.

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According to the Ozone Determination, Section II, *Analysis Years*, an emission analysis is required for the eight-hour ozone attainment year, 2009, and the one-hour ozone budget (milestone) year, 2010. The budget for volatile organic compounds (VOC) and nitrogen oxides ($NO_x$) emissions to meet the 2010 milestone target is found in Section II, *Background*, Table 1, *Emission Inventory and SIP Budgets for the Columbus Maintenance Area*, as reproduced in Figure 2. There is no emission budget for the attainment year 2009.

**Table 1: Emission Inventory and SIP Budgets for the Columbus Maintenance Area**

| | VOC in tons/day | | | | NOx in tons/day | | | |
|---|---|---|---|---|---|---|---|---|
| | Point | Area | Mobile | Total | Point | Area | Mobile | Total |
| 1990 Inventory | 16.44 | 101.18 | 94.73 | 212.35 | 13.79 | 96.68 | 78.65 | 189.12 |
| 1996 Inventory | 17.52 | 107.47 | 63.36 | 188.35 | 14.35 | 102.62 | 68.85 | 185.82 |
| 2005 Budget | 19.33 | 117.30 | 61.38 | 198.01 | 15.27 | 111.82 | 61.24 | 188.33 |
| 2010 Budget | 20.27 | 123.94 | 67.99 | 212.20 | 12.17 | 101.99 | 70.99 | 185.15 |
| | 2010 Safety Margin | | | 0.15 | 2010 Safety Margin | | | 3.97 |

**FIGURE 2.** Emission inventory SIP budget obtained from the Ozone Determination. Source: MORPC, *Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the Franklin, Delaware, Licking, Fairfield, Madison, and Knox County Ozone Non-Attainment Area*. April 28, 2005.

Also stated in the Ozone Determination, the U.S. Environmental Protection Agency (USEPA) MOBILE6.2 program was used to generate the emission factors for motor vehicles for the conformity analysis. The MOBILE6.2 input and output files, along with the reference files required to run the emission factor calculations for Franklin County, were provided to the FAA consultant by MORPC.[5]

According to the $PM_{2.5}$ Determination, Section II, *Analysis Years*, the years for analysis required for the $PM_{2.5}$ nonattainment area are 2020 and 2030. Both years are beyond the farthest planning year for the CMH EIS, which is 2018. In Section III, *Emission Projections*, of the same document, MROPC states there is "not yet a SIP with emission budgets" for emissions of $PM_{2.5}$.

[5] MOBILE6.2 files were provided to Landrum & Brown, via an e-mail transmission from Ms. Chandra Parasa, MORPC, on April 9, 2007.





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# IV. REGULATORY THRESHOLDS

The assessment of air quality will be prepared in accordance with the guidelines provided in the FAA *Air Quality Procedures for Civilian Airports & Air Force Bases,*[6] and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, which together with the guidelines of FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, constitutes compliance to all the relevant provisions of NEPA, the CAA, and the Ohio SIP.

The General Conformity Rule, established under CAA, would apply to the project proposed for the CMH EIS. Therefore, ***an inventory of net emissions* will be prepared** for comparison to the relevant de minimis thresholds given under 40 CFR Part 93. Net emissions would be calculated by comparing the inventory of the "no-build" versus the "build" emissions for 2009, 2010, 2012, and 2018, in addition to the year of greatest emissions, which has not yet been determined. The relevant de minimis thresholds applicable to the project proposed in the CMH EIS are ***100 tons per year for each*** of the following criteria and precursor pollutants:

- $PM_{2.5}$
- $NO_x$
- VOC
- $SO_x$

Emissions of $NO_x$ and VOC are considered precursors to ozone development, and emissions of sulfur oxides ($SO_x$), along with $NO_x$, are considered precursors to the development of $PM_{2.5}$ in the atmosphere.

Pursuant to NEPA guidelines and 40 CFR Part 93, ***dispersion analysis will be conducted*** for the air quality assessment of the project proposed for the CMH EIS. The computer modeling results will be added to the background concentrations of the criteria pollutants to determine the project's design concentrations. The background concentrations in Franklin County, which were provided to the FAA consultant by MORPC,[7] are summarized in **Table 1**. The associated National Ambient Air Quality Standards (NAAQS) are also provided for comparison. A map of the location of the five monitoring sites that recorded data for the development of the background concentrations in Franklin County is presented in **Exhibit 1, *Central Ohio Air Quality Monitoring Sites***.

[6] FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
[7] Background concentration data were provided to Landrum & Brown, via an e-mail transmission from Ms. Sarah Hedlund, Ohio EPA, during May 2007.

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**TABLE 1**
**FRANKLIN COUNTY BACKGROUND CONCENTRATIONS**

| CRITERIA POLLUTANT | AVERAGING PEROD | CONCENTRATION (μg/m$^3$) | NAAQS (μg/m$^3$) |
|---|---|---|---|
| CO | 1-Hour | 4,796.4 | 40,000 |
| | 8-Hour | 2,284 | 10,000 |
| $NO_x$ | Annual | 39 | 100 |
| $PM_{10}$ | 24-Hour | 85 | 150 |
| $PM_{2.5}$ | 24-Hour | 52.1 | 35 |
| | Annual | 16.67 | 15 |
| $SO_x$ | 24-Hour | 73.36 | 365 |
| | Annual | 10.74 | 80 |

Source: Ohio EPA, May 2007.
40 CFR Part 50.
Landrum & Brown analysis, 2007.

## V. METEOROLOGY

The emission inventory will be prepared using the FAA Emissions and Dispersion Modeling System Version 4.5 (EDMS). The inventory calculations require the average annual temperature and the average annual mixing height. The values are provided in **Table 2, *Meteorological Parameters for the Emission Inventory***.

Dispersion analysis of the criteria pollutant emissions calculated for the emission inventory will also be conducted using EDMS. The dispersion calculations require one full year of meteorological data that includes several parameters such as temperature, pressure, wind speed, and wind direction for each hour of the year. Hourly surface aviation meteorological data obtained from the National Climatic Data Center (NCDC) for the Port Columbus International Airport for 2005[8] will be used for existing conditions. The upper air data required for the analysis was also obtained from NCDC for the nearest upper-air station to the airport, which is the Wilmington National Weather Service Office. Refer to **Table 3, *Meteorological Data for Dispersion Analysis.***

8 Year 2005 meteorological data was the most recent credible database available.





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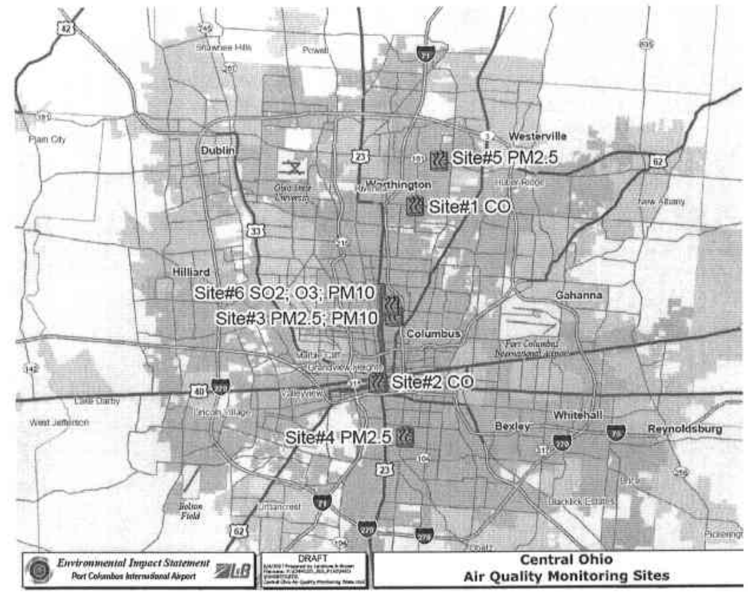


**EXHIBIT 1.** Central Ohio Air Quality Monitoring Sites.
Source: MORPC, http://airquality.morpc1.org/sitemap.cfm
Landrum & Brown analysis, 2007.

**TABLE 2**
**METEOROLOGICAL PARAMETERS FOR THE EMISSION INVENTORY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| METEROLOGICAL PARAMETER | VALUE | SOURCE |
|---|---|---|
| Average Annual Temperature | 52.9 Deg. F | 1971-2000 NCDC Normals for Columbus WSO Airport, OH (COLUMBUS INTL AP, FRANKLIN CO.), *Historic Climate Data: Temperature Summary*, Midwestern Regional Climate Center, U.S. Cooperative Network, a cooperative program of the Illinois State Water Survey and the National Climatic Data Center (NCDC), http://mcc.sws.uiuc.edu/climate_midwest/historical/temp/oh/331786_tsum.html |
| Average Annual Mixing Height | 3,052 feet | USEPA, Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States, AP-101, January 1972, Table B-1, *Mean Seasonal and Annual Morning and Afternoon Mixing Heights and Wind Speeds for NOP and All Cases.* |

Note: WSO is Weather Service Office.
NOP refers to no precipitation.
Deg. F refers to degrees Fahrenheit.

According to the letter from Ms. Katherine Jones, FAA Community Planner, dated October 17, 2006,[9] a teleconference was held October 2, 2006, to determine the number of years of meteorological data would be applied to dispersion modeling for the CMH EIS. According to the minutes summarizing the teleconference proceedings:

> "The modeling is done with 5 years of met data for the base case. Then the worst-case year is chosen and used to evaluate the alternatives in the EIS. When the final alternative is chosen, then the alternative is run with the 5 years of met data. USEPA and the Ohio Environmental Protection Agency (OEPA) concurred with this approach."

[9] Letter from Ms. Katherine S. Jones, FAA Community Planner, to Ms. Sherry Kamke, Environmental Scientist, USEPA Region 5, dated October 17, 2006, with attached minutes summarizing the teleconference held October 2, 2006.





**TABLE 3**
**METEOROLOGICAL DATA FOR DISPERSION ANALYSIS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| DATA REQUIREMENT | ANNUAL NUMBER OF OBSERVATIONS | SOURCE |
|---|---|---|
| Year 2005 Hourly Surface Aviation Observations | 8,760 | National Climatic Data Center (NCDC) for Port Columbus International Airport, collected by the National Weather Service, Columbus, Ohio. |
| Year 2005 Upper-Air Observations | 730 | National Climatic Data Center (NCDC), collected by the National Weather Service, Wilmington, Ohio. |

The identification of the specific five years of meteorological data that will be applied to dispersion modeling for this project has not been determined. The FAA would request guidance from USEPA and OEPA regarding the required years of data for analysis. Further, suggestions from USEPA and OEPA for a methodology to determine the worst-case data year is requested.

## VI. EMISSION SOURCES

The emission inventory will be prepared for each of the scenarios listed under Section I, *Introduction*. Several types of emission sources will be evaluated for the emission inventory; the identical sources will be analyzed through dispersion analysis. The sources include:

- Aircraft
- APUs (auxiliary power units)
- Ground support equipment (GSE)
- Motor vehicles in parking lots and parking garages
- Motor vehicles on airport access roadways
- Stationary sources, including fuel tank storage, deicing, emergency generators, boilers, an incinerator, and painting operations

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### VI-1. Aircraft, APUs, and GSE

The aircraft fleet will be based on the fleet evaluated for the noise analysis except airframe and aircraft engine substitutions will be necessary to match the units available in the EDMS database. The aircraft and engine types that will be used for analysis of existing conditions are given in **Table 4**.

For the emission inventory, the computer model requires the combined average ground taxi and ground delay time. This information was obtained from the *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*.[10] The data from Table 2-11 of the planning report will be used as a basis for developing data for taxi time and delay under the existing and future baseline airfield configuration and the future proposed configuration. The data from Table 2-11 is reproduced in **Figure 3**.

**TABLE 2-11**
**COMPARISON OF DAILY VFR AND IFR**
**AVERAGE ARRIVAL AND DEPARTURE TIMES**
**2023 BASELINE SCENARIO**

| Baseline Scenario | | Average Arrival Time (in Minutes) | | | Average Departure Time (in Minutes) | |
|---|---|---|---|---|---|---|
| | | Air Delay | Ground Delay | Ground Taxi | Ground + Queue Delay | Ground Taxi |
| VFR | Existing Airfield | 0.6 | 0.0 | 3.8 | 1.3 | 8.6 |
| | Proposed Airfield | 0.6 | 0.0 | 3.7 | 1.3 | 8.8 |
| IFR | Existing Airfield | 0.8 | 0.0 | 3.9 | 7.6 | 9.0 |
| | Proposed Airfield | 0.7 | 0.0 | 3.8 | 5.9 | 9.2 |

Source: TransSolutions, Inc., 2005.

**FIGURE 3.** Average airport taxi and delay times.
Source: CRAA, *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*, prepared by URS, dated June 6, 2005.

The use of APUs will be made using the EDMS default assignments. Ground support equipment was assigned based on the on-site survey completed in July 2006, and is based on aircraft type, as described in **Table 5**. The results of the survey are given in **Table 6**.

[10] CRAA, *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*, prepared by URS, dated June 6, 2005.





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**TABLE 4**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| 550 Citation | JT15D-4 (B,C,D) | 1120 |
| 550 Citation | JT15D-4 (B,C,D) | 240 |
| 550 Citation | JT15D-4 (B,C,D) | 876 |
| 550 Citation | JT15D-4 (B,C,D) | 600 |
| 550 Citation | JT15D-4 (B,C,D) | 1818 |
| 550 Citation | JT15D-4 (B,C,D) | 2962 |
| 550 Citation | JT15D-4 (B,C,D) | 3760 |
| 550 Citation | JT15D-4 (B,C,D) | 1032 |
| A319 | V2522-A5 | 100 |
| A319 | V2522-A5 | 238 |
| A319 | V2522-A5 | 730 |
| A319 | V2522-A5 | 378 |
| A319 | V2524-A5 | 52 |
| A319 | V2524-A5 | 122 |
| A319 | V2524-A5 | 376 |
| A319 | V2524-A5 | 194 |
| A320-200 | V2500-A1 | 42 |
| A320-200 | V2500-A1 | 134 |
| A320-200 | V2500-A1 | 260 |
| A320-200 | V2500-A1 | 114 |
| A320-200 | V2527-A5 | 124 |
| A320-200 | V2527-A5 | 400 |
| A320-200 | V2527-A5 | 778 |
| A320-200 | V2527-A5 | 342 |
| Aztec | TIO-540-J2B2 | 892 |
| Aztec | TIO-540-J2B2 | 1212 |
| Aztec | TIO-540-J2B2 | 2952 |
| Aztec | TIO-540-J2B2 | 2982 |
| B737-300 | CFM56-3-B1 | 730 |
| B737-300 | CFM56-3-B1 | 2000 |
| B737-300 | CFM56-3-B1 | 5040 |
| B737-300 | CFM56-3-B1 | 2450 |
| B737-300 | CFM56-3B-2 | 98 |
| B737-300 | CFM56-3B-2 | 228 |
| B737-300 | CFM56-3B-2 | 746 |

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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| B737-300 | CFM56-3B-2 | 388 |
| B737-300 | CFM56-3C-1 (Rerated) | 158 |
| B737-300 | CFM56-3C-1 (Rerated) | 446 |
| B737-300 | CFM56-3C-1 (Rerated) | 1072 |
| B737-300 | CFM56-3C-1 (Rerated) | 514 |
| B737-500 | CFM56-3C-1 | 50 |
| B737-500 | CFM56-3C-1 | 120 |
| B737-500 | CFM56-3C-1 | 368 |
| B737-500 | CFM56-3C-1 | 190 |
| B737-700 | CFM56-7B22 | 626 |
| B737-700 | CFM56-7B22 | 1686 |
| B737-700 | CFM56-7B22 | 4328 |
| B737-700 | CFM56-7B22 | 2120 |
| B737-800 | CFM56-7B26 | 102 |
| B737-800 | CFM56-7B26 | 240 |
| B737-800 | CFM56-7B26 | 738 |
| B737-800 | CFM56-7B26 | 382 |
| B757-300 | PW2043 | 50 |
| B757-300 | PW2043 | 120 |
| B757-300 | PW2043 | 368 |
| B757-300 | PW2043 | 190 |
| BAE146-300 | LF507 SERIES | 214 |
| BAE146-300 | LF507 SERIES | 114 |
| BAE146-300 | LF507 SERIES | 372 |
| BAE146-300 | LF507 SERIES | 760 |
| BH-1900 | PT6A-67D | 116 |
| BH-1900 | PT6A-67D | 104 |
| BH-1900 | PT6A-67D | 294 |
| BH-1900 | PT6A-67D | 398 |
| Bombardier CRJ700 | CF34-8C1 | 1874 |
| Bombardier CRJ700 | CF34-8C1 | 1016 |
| Bombardier CRJ700 | CF34-8C1 | 3094 |
| Bombardier CRJ700 | CF34-8C1 | 6426 |
| Cessna 172 Skyhawk | O-320 | 1086 |
| Cessna 172 Skyhawk | O-320 | 1762 |





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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| Cessna 172 Skyhawk | O-320 | 5050 |
| Cessna 172 Skyhawk | O-320 | 3790 |
| Cessna 441 Conquest2 | TPE331-8 | 128 |
| Cessna 441 Conquest2 | TPE331-8 | 386 |
| Cessna 441 Conquest2 | TPE331-8 | 1192 |
| Cessna 441 Conquest2 | TPE331-8 | 486 |
| Cessna T337 | IO-360-B | 70 |
| Cessna T337 | IO-360-B | 178 |
| Cessna T337 | IO-360-B | 278 |
| Cessna T337 | IO-360-B | 204 |
| CITATION I SP | JT15D-1A & 1B | 74 |
| CITATION I SP | JT15D-1A & 1B | 280 |
| CITATION I SP | JT15D-1A & 1B | 818 |
| CITATION I SP | JT15D-1A & 1B | 288 |
| CL600 | ALF 502L-2 | 786 |
| CL600 | ALF 502L-2 | 440 |
| CL600 | ALF 502L-2 | 1234 |
| CL600 | ALF 502L-2 | 2652 |
| DC9-30 | JT8D-15 (old comb) | 256 |
| DC9-30 | JT8D-15 (old comb) | 674 |
| DC9-30 | JT8D-15 (old comb) | 1816 |
| DC9-30 | JT8D-15 (old comb) | 902 |
| DC9-50 | JT8D-17 (old comb) | 108 |
| DC9-50 | JT8D-17 (old comb) | 326 |
| DC9-50 | JT8D-17 (old comb) | 702 |
| DC9-50 | JT8D-17 (old comb) | 324 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 2108 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 1176 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 3380 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 7208 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 222 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 124 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 356 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 758 |
| Embraer ERJ 145 | AE3007A | 110 |

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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| Embraer ERJ 145 | AE3007A | 62 |
| Embraer ERJ 145 | AE3007A | 178 |
| Embraer ERJ 145 | AE3007A | 380 |
| Embraer ERJ 145 | AE3007A1E | 222 |
| Embraer ERJ 145 | AE3007A1E | 124 |
| Embraer ERJ 145 | AE3007A1E | 356 |
| Embraer ERJ 145 | AE3007A1E | 758 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 1442 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 804 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 2312 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 4932 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 1774 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 990 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 2846 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 6070 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 1886 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 1052 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 3024 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 6450 |
| Embraer ERJ 170 | CF34-8E5 | 1102 |
| Embraer ERJ 170 | CF34-8E5 | 598 |
| Embraer ERJ 170 | CF34-8E5 | 1820 |
| Embraer ERJ 170 | CF34-8E5 | 3780 |
| F-27 SERIES | RDa7 | 440 |
| F-27 SERIES | RDa7 | 514 |
| F-27 SERIES | RDa7 | 1218 |
| F-27 SERIES | RDa7 | 1478 |
| Falcon 20 | CF700-2D | 68 |
| Falcon 20 | CF700-2D | 250 |
| Falcon 20 | CF700-2D | 846 |
| Falcon 20 | CF700-2D | 294 |
| Falcon 2000EX | PW308C | 214 |
| Falcon 2000EX | PW308C | 348 |
| Falcon 2000EX | PW308C | 314 |
| Falcon 2000EX | PW308C | 114 |





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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| Falcon 2000EX | PW308C | 372 |
| Falcon 2000EX | PW308C | 880 |
| Falcon 2000EX | PW308C | 760 |
| Falcon 2000EX | PW308C | 1,194 |
| Gulfstream II | SPEY MK511-8 | 68 |
| Gulfstream II | SPEY MK511-8 | 250 |
| Gulfstream II | SPEY MK511-8 | 846 |
| Gulfstream II | SPEY MK511-8 | 294 |
| Gulfstream IV | TAY Mk611-8 | 102 |
| Gulfstream IV | TAY Mk611-8 | 386 |
| Gulfstream IV | TAY Mk611-8 | 1,264 |
| Gulfstream IV | TAY Mk611-8 | 436 |
| HS 125 | TFE731-3 | 354 |
| HS 125 | TFE731-3 | 180 |
| HS 125 | TFE731-3 | 550 |
| HS 125 | TFE731-3 | 1,106 |
| KC-135R | TF33-P-5&9 | 102 |
| KC-135R | TF33-P-5&9 | 240 |
| KC-135R | TF33-P-5&9 | 738 |
| KC-135R | TF33-P-5&9 | 382 |
| Learjet 25C | CJ610-6 | 308 |
| Learjet 25C | CJ610-6 | 1,126 |
| Learjet 25C | CJ610-6 | 3,808 |
| Learjet 25C | CJ610-6 | 1,328 |
| Learjet 35/36 | TFE 731-2-2B | 278 |
| Learjet 35/36 | TFE 731-2-2B | 1,042 |
| Learjet 35/36 | TFE 731-2-2B | 3,352 |
| Learjet 35/36 | TFE 731-2-2B | 1,168 |
| MD-80-82 | JT8D-217 (old comb) | 50 |
| MD-80-82 | JT8D-217 (old comb) | 120 |
| MD-80-82 | JT8D-217 (old comb) | 368 |
| MD-80-82 | JT8D-217 (old comb) | 190 |
| MD-80-83 | JT8D-219 old comb | 366 |
| MD-80-83 | JT8D-219 old comb | 1,000 |
| MD-80-83 | JT8D-219 old comb | 2,520 |

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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| MD-80-83 | JT8D-219 old comb | 1,224 |
| Navajo | TIO-540-J2B2 | 814 |
| Navajo | TIO-540-J2B2 | 900 |
| Navajo | TIO-540-J2B2 | 2,780 |
| Navajo | TIO-540-J2B2 | 2,814 |
| Piper PA-28 | O-320 | 84 |
| Piper PA-28 | O-320 | 256 |
| Piper PA-28 | O-320 | 794 |
| Piper PA-28 | O-320 | 324 |
| SF-340-B PLUS | CT7-5 | 186 |
| SF-340-B PLUS | CT7-5 | 168 |
| SF-340-B PLUS | CT7-5 | 470 |
| SF-340-B PLUS | CT7-5 | 638 |
| UC-12J | PT6A-67B | 144 |
| UC-12J | PT6A-67B | 478 |
| UC-12J | PT6A-67B | 1,078 |
| UC-12J | PT6A-67B | 490 |
| **TOTAL OPERATIONS** | | **197,122** |





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**TABLE 5**
**AIRCRAFT GSE SURVEYED BY TYPE AND CATEGORY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| JET AIRCRAFT | | TURBOPROP AIRCRAFT |
|---|---|---|
| LARGE JETS | SMALLER JETS | |
| MD88 | Embraer Regional Jet | Dornier 328 |
| Boeing 737 | | Dash 8 |
| | | Saab 340 |
| | | Beech 1900 |

Note: General aviation and cargo aircraft were not surveyed.

**TABLE 6**
**AIRCRAFT GSE ASSIGNMENTS BASED ON THE SURVEY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| GSE TYPE | AIRCRAFT TYPE (minutes per landing/takeoff cycle) | | |
|---|---|---|---|
| | LARGE JETS | SMALLER JETS | TURBOPROPS |
| Diesel Aircraft Tractor | 21 | 9 | 6 |
| Diesel Baggage Tractor | 57 | 12 | 2 |
| Gasoline Baggage Tractor | | 26 | 20 |
| Diesel Belt Loader | 46 | 28 | |
| Gasoline Belt Loader | 22 | 21 | 21 |
| Gasoline Catering Truck | 15 | | |
| Diesel Fuel Truck | 20 | 11 | 10 |
| Electric GPU Hookup (400 Hz) | | | 30 |

Note: EDMS default assignments were used for general aviation GSE and cargo GSE.

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## VI-2. Motor Vehicles in Parking Lots and Garages

Data relating to motor vehicles utilizing the airport's parking lots and garages was obtained from the following sources:

- *International Gateway Realignment, Categorical Exclusion Reevaluation Level 4*, prepared for the Ohio Department of Transportation, District 6, dated August 2006.
- *Traffic Impact Study: 17th Avenue Parking Lot*, prepared for the CRAA, preliminary report dated October 19, 2006.
- *Traffic Impact Study: New Employee Parking Lot*, prepared for the CRAA, preliminary report dated October 19, 2006.
- *Rental Car Update & Analysis*, prepared for the CRAA, dated February 2005.

A diagram of the parking lots and garages that were considered for analysis is presented in **Exhibit 2, *Parking Lots and Garages – Mobile Sources***.





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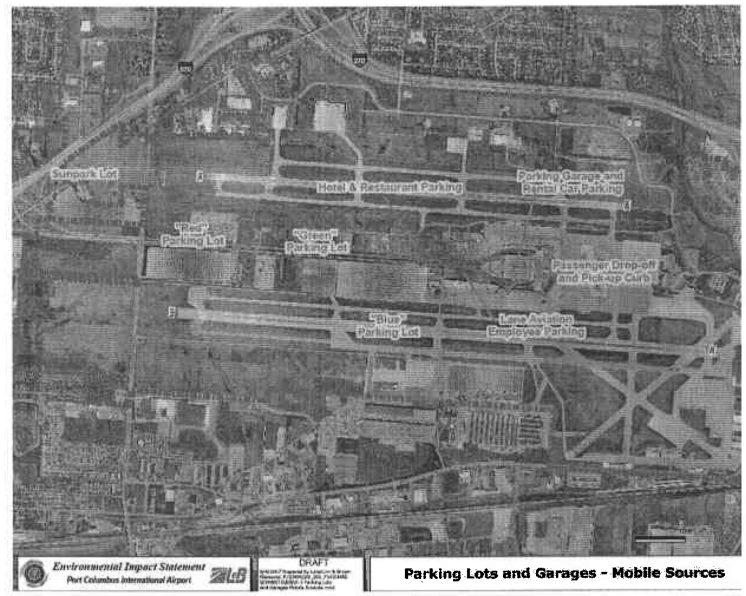


**EXHIBIT 2.** Location of parking lots and garages at the airport.
Source: Landrum & Brown analysis, 2007.

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### VI-3. Motor Vehicles on Roadways

Data relating to motor vehicles traversing the airport's access roadways was obtained from the same sources used for parking lots and garages.

A diagram of the airport's access roadways that were considered for analysis is presented in **Exhibit 3**, ***Location of Roadways***. Not all the roadways will be represented in the final document if data is not available.

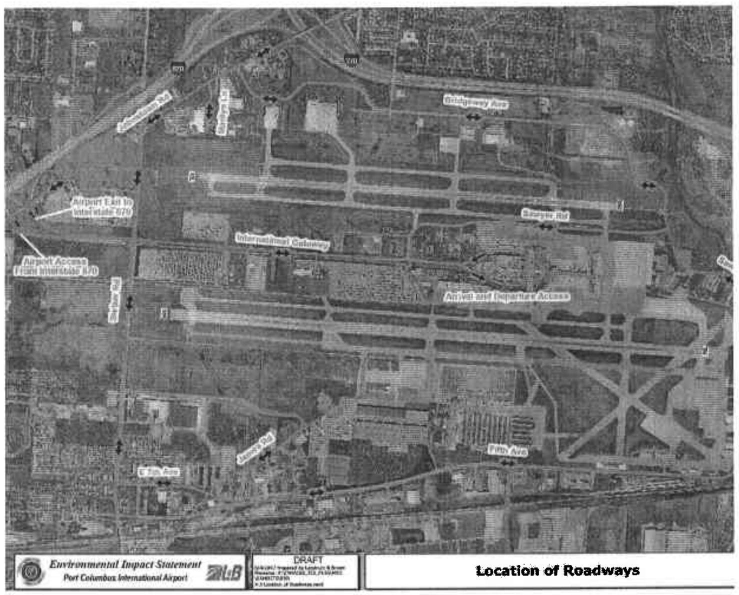


**EXHIBIT 3.** Location of roadways at CMH considered for inclusion in computer air quality modeling.
Source: Landrum & Brown analysis, 2007.





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### VI-4. Stationary Sources

Stationary sources of emissions were identified based on the on-site survey completed in July 2006. The sources identified in the survey are given in **Table 7**. The location of the stationary sources inventoried in the survey is presented in **Exhibit 4**, ***Location of Stationary Sources***.

**TABLE 7**
**STATIOINARY SOURCES INVENTORY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| MAP ID | STATIONARY SOURCE | TYPE |
|---|---|---|
| 1 | Concourse A | Emergency Generator W/ Diesel Fuel Tank |
| 2 | Concourse B Diesel | Emergency Generator W/ Diesel Fuel Tank |
| 3 | Concourse B Natural Gas | Natural Gas Boiler |
| 4 | Concourse C | Emergency Generator W/ Diesel Fuel Tank |
| 5 | PEA | Natural Gas Boiler |
| 6 | Lane Corridor A | Natural Gas Boiler |
| 7 | Lane Hangar 3 | Natural Gas Boiler |
| 8 | Lane Hangar 4 | Natural Gas Boiler |
| 9 | Lane Hangar 5 | Natural Gas Boiler |
| 10 | Backup IT | Emergency Generator W/ Diesel Fuel Tank |
| 11 | Backup Concourse A | Natural Gas Boiler |
| 12 | Backup Concourse C | Emergency Generator W/ Diesel Fuel Tank |
| 13 | Misc. Concourse B | Emergency Generator W/ Diesel Fuel Tank |
| 14 | Backup Garage | Emergency Generator W/ Diesel Fuel Tank |
| 15 | Backup ARFF | Emergency Generator W/ Diesel Fuel Tank |
| 16 | Aircraft Deice PG TI | Deice Area |
| 17 | Aircraft Deice EG | Deice Area |
| 18 | Airfield Maintenance Gas | Gasoline Storage Tank |
| 19 | Airfield Maintenance Diesel | Diesel Fuel Storage Tank |
| 20 | Lane - Jet A | Jet A Storage Tanks |
| 21 | Lane Diesel | Diesel Fuel Storage Tank |
| 22 | Lane Gasoline | Gasoline Storage Tank |
| 23 | Incinerator | Incinerator |
| 24 | Air Deice PG TIV | Deice Area |
| 25 | Lane 100LL | Avgas Storage Tanks |
| 26 | Runway Deice KOAC | Deice Area |
| 27 | Million Air Jet A | Jet A Storage Tanks |
| 28 | Million Air Diesel | Diesel Fuel Storage Tank |
| 29 | Million Air Av Gas | Aviation gasoline (AvGas) Storage Tank |

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**TABLE 7 (CONTINUED)**
**STATIOINARY SOURCES INVENTORY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| MAP ID | STATIONARY SOURCE | TYPE |
|---|---|---|
| 1 | Concourse A | Emergency Generator W/ Diesel Fuel Tank |
| 30 | 45 Hotel Jet A | Jet A Storage Tanks |
| 31 | Alamo Gasoline (not in use) | Gasoline Storage Tank |
| 32 | Dollar Gasoline | Gasoline Storage Tank |
| 33 | Englefield Gasoline | Gasoline Storage Tank |
| 34 | Englefield Gasoline | Gasoline Storage Tank |
| 35 | Englefield Gasoline | Gasoline Storage Tank |
| 36 | Englefield Diesel (airport is not a customer) | Diesel Fuel Storage Tank |
| 37 | Englefield Kerosene (airport is not a customer) | Kerosene Storage Tank |
| 38 | FAA Control Tower | Emergency Generator W/ Diesel Fuel Tank |
| 39 | Hertz Gasoline | Gasoline Storage Tank |
| 40 | NetJets Diesel | Emergency Generator W/ Diesel Fuel Tank |
| 41 | Quick Turnaround Gasoline | Gasoline Storage Tanks |
| 42 | Avis Gasoline | Gasoline Storage Tank |
| 43 | National Gasoline | Gasoline Storage Tank |
| 44 | FAA ASR-9 | Emergency Generator W/ Diesel Fuel Tank |
| 45 | Flight Safety | Emergency Generator W/ Diesel Fuel Tank |
| 46 | Lift Station | Emergency Generator W/ Diesel Fuel Tank |
| 47 | Electrical Vault | Emergency Generator W/ Diesel Fuel Tank |
| 48 | NetJets | Emergency Generator W/ Diesel Fuel Tank |
| 49 | Nationwide | Emergency Generator W/ Diesel Fuel Tank |
| 50 | North Fuel Farm | Jet A Storage Tanks |





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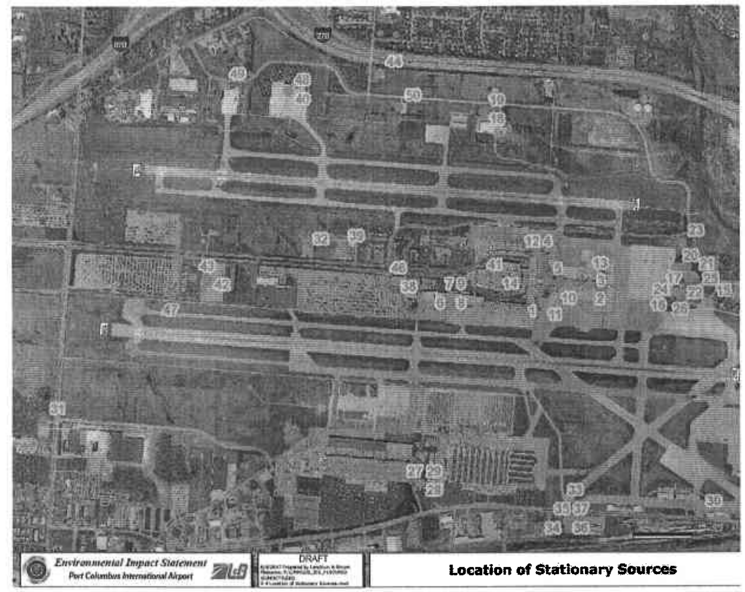


**EXHIBIT 4.** Location of stationary sources identified in the on-site survey.
Source: Landrum & Brown analysis, 2007.

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# VII. DISPERSION ANALYSIS

The dispersion analysis will be conducted for the criteria pollutants (excluding ozone and lead, and not including VOC) using the EDMS. Dispersion modeling will be applied to all the scenarios listed in Section I, *Introduction*, except the 2009 and 2010 SIP years, which require an emission inventory and not dispersion modeling. The same sources evaluated for the emission inventory described in Section VI, *Emission Sources*, will be evaluated through dispersion modeling.

## VII-1 Aircraft

Aircraft for each of the scenarios will be assigned to a gate area, grouped by runway end, and will include the taxi path to and from the runway end. Three general gate areas were identified, the terminal gates, the cargo area, and the general aviation ramp. Taxi paths will be determined by assigning the longest (worst-case) path from each runway end to and from the associated gate area. Each aircraft will be assigned to a runway end according to the runway use distribution described for the noise analysis.

## VII-2 Receptors

Over 100 receptors will be assigned for dispersion modeling for the existing conditions. The receptors are shown in **Exhibit 5**, ***Airport and Parking Lot Dispersion Receptor Locations***, and **Exhibit 6**, ***Terminal Area Dispersion Receptor Locations***. Following the identification of the worst-case weather year, dispersion modeling will be applied to no more than five discrete receptors.

The first array of receptors will be located every ten degrees around the airport property line perimeter, beginning at 360 degrees, as measured from the airport reference point. Another ring of receptors will be located outward 1,500 feet, and a third ring of receptors will be located 1,500 feet further out from the property line. Additional receptors will be placed in the parking areas as shown in Exhibit 5.

A second grid of receptors will be located across International Gateway from Stelzer Road to the parking garage adjacent to the terminal. This grid is illustrated in Exhibit 6.

The identification of the discrete receptors that will be applied to the dispersion analysis of the project alternatives has not been determined. The FAA would request guidance from USEPA and OEPA for a methodology to determine the location of the discrete receptors.





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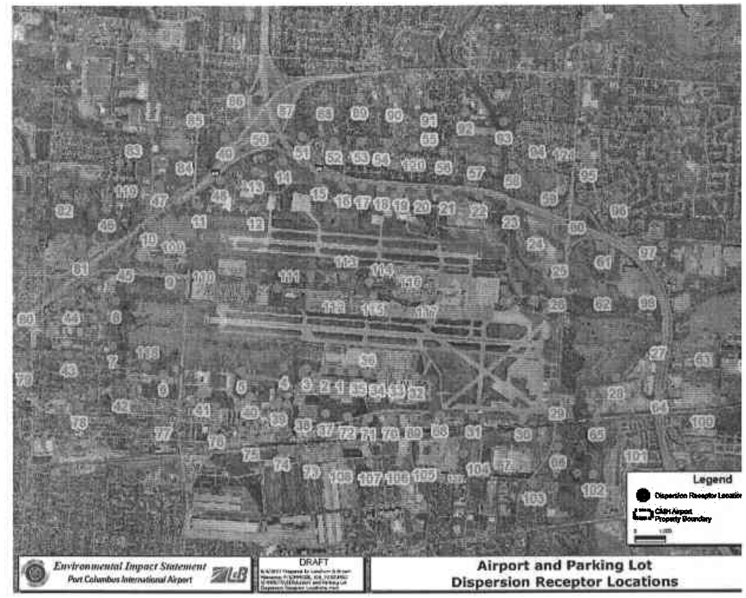


**EXHIBIT 5**. Location of airport and parking lot receptor locations.
Source: Landrum & Brown analysis, 2007.

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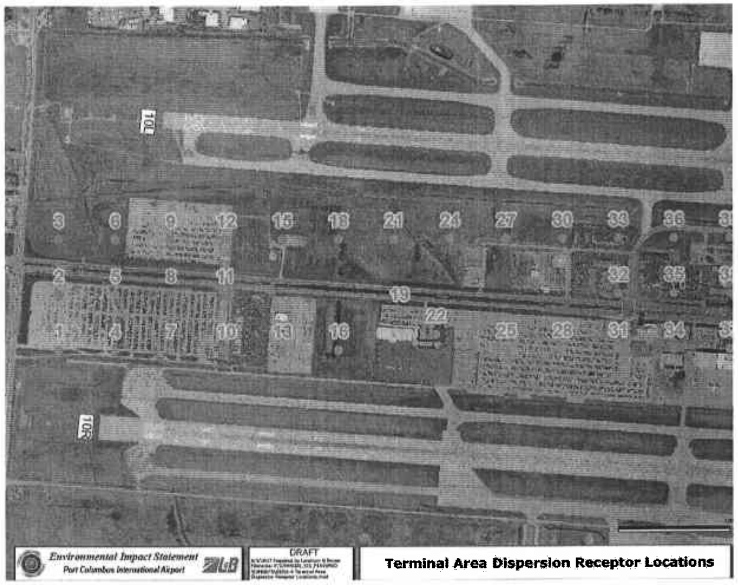


**EXHIBIT 6**. Location of the terminal area dispersion receptor locations.
Source: Landrum & Brown analysis, 2007.





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# VIII. CONSTRUCTION EMISSIONS INVENTORY

The inventory of emissions from the use of construction equipment will be calculated using USEPA approved methodology. Emission factors for the Tier 2 and Tier 3 emission standards for nonroad diesel engines applicable for 2005 will be used for calculation of the inventory.[11] This allows the construction contractor the opportunity to use readily available tier-compliant equipment.

# IX. OUTSTANDING DATA NEEDS

The identification of the ***specific five years of meteorological data*** that will be applied to dispersion modeling for this project has not been determined. The FAA would request guidance from USEPA and OEPA regarding the required years of data for analysis. Further, suggestions from USEPA and OEPA for a ***methodology to determine the worst-case data year*** is requested.

The ***identification of the five discrete*** receptors that will be applied to dispersion modeling for this project has not been determined. The FAA would request guidance from USEPA and OEPA for a methodology to determine the discrete receptors.

[11] 40 CFR Part 89.

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## X. NEXT STEPS

Written comments and/or questions regarding the discussion or material provided during this scoping meeting should be mailed within 30 days following the scoping meeting or no later than ***July 19, 2007***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174

**Email:** CMHEIS@FAA.GOV

**Website:** www.Airportsites.net/CMH-EIS

***This scoping document is provided as a draft and should not be considered the final authority for assessing air quality for CMH EIS. As the project progresses, changes in planning may require adjustments of the methodology and procedures given in this document.***



# *Federal Aviation Administration*

## ENVIRONMENTAL IMPACT STATEMENT

**FOR**

## REPLACEMENT RUNWAY AND TERMINAL EXPANSION

**AT**

## PORT COLUMBUS INTERNATIONAL AIRPORT

### AIR QUALITY SCOPING MEETING SUMMARY

**MEETING CONDUCTED**

**JUNE 19, 2007**

**9:00 A.M. – 12:00 P.M.**

The second in a series of air quality scoping meetings was conducted on Tuesday, June 19, 2007, at the office of the Ohio Environmental Protection Agency (OEPA) in Columbus, Ohio. The purpose of the meeting was to continue coordination of the air quality assessment for the Port Columbus International Airport Environmental Impact Statement (CMH EIS). The following agencies were represented at the meeting, either in person or through teleconference:

- U.S. Environmental Protection Agency (USEPA, teleconference)
- Ohio Environmental Protection Agency (OEPA)
- Mid-Ohio Regional Planning Commission (MORPC)
- Columbus Regional Airport Authority (CRAA)
- FAA consultants, Landrum & Brown

The contact information for each of the participants is attached following the minutes of the meeting as **Attachment A**. A meeting agenda and discussion outline were distributed to the meeting participants in advance of the meeting and are attached to this document as **Attachment B**, which also includes a copy of the revised discussion outline based on comments received immediately following the meeting and prior to the distribution of the minutes of the meeting, and a copy of the letter from Ms. Katherine Jones, FAA, to USEPA regarding comments from the first air quality scoping meeting held on July 19, 2006. The meeting discussion focused on the status of the air quality assessment thus far, which included the development of data that will be used for the preparation of the emission inventories and the dispersion analysis for the project analysis.

**Summary Notes from the June 19, 2007 Meeting**

The meeting began at 9:00 a.m. Eastern Daylight Time, and was opened by Mr. Rob Adams, the Project Manager for Landrum & Brown, the FAA consultant and the FAA's representative for this meeting. Following introductions of the participants, the meeting was led by Ms. Virginia Raps, Landrum & Brown air quality manager for the CMH EIS.

Proposed Project

Ms. Raps provided a brief overview of the scenarios that would be evaluated in the air quality assessment, which will account for the interim State Implementation Plan (SIP) analysis years required under the Clean Air Act Amendments of 1990 (CAA), as well as the analysis years for the EIS. Mr. Bill Spires, OEPA, asked for clarification of the actual project alternatives proposed for the EIS. Mr. Adams responded that two alternatives would be considered - replacement of Runway 10R/28L at a distance 702 feet to the south of the runway's existing position and alternately to a position 800 feet to the south. In addition, each of these alternatives would be evaluated with and without the implementation of the noise compatibility program measures proposed in the EIS. The FAA preferred alternative will be determined following review of the draft EIS.

Ohio State Implementation Plan

Ms. Raps described the two documents that contain information regarding the conformity determinations for Franklin County with respect to the ozone and fine particulate matter ($PM_{2.5}$) status of Franklin County (refer to Section III, *Ohio SIP*, in the attached discussion outline) referred to as the Ozone Determination and the $PM_{2.5}$ Determination. These are the conformity demonstrations for the ozone and $PM_{2.5}$ nonattainment areas. The Ozone Determination contained the projected budget of emissions for 2009 (the eight-hour ozone attainment year) and 2010, the one-hour ozone milestone year. The CAA requires an impact analysis (emission inventory) for each of these years when the General Conformity Rule is applicable to the project, which is the case for the CMH EIS. Mr. Bill Spires, OEPA, concurred that the analysis should include an emission inventory for 2009 and 2010 for the purposes of the General Conformity evaluation.

Ms. Sherry Kamke (USEPA, attending via teleconference) asked if the budget inventory shown in Figure 2 of the discussion outline was the regional budget or would there be a budget that reflects just the airport (CMH) emissions. Mr. Spires will check on whether a CMH emission budgets exists and if so, will forward that information to Landrum & Brown for disclosure in the CMH EIS. This information was received from OPEA following the meeting.

Ms. Virginia Raps confirmed that the list of aircraft and annual aircraft operations for 2006 existing conditions used in the EIS was provided to Tom Velalis, OEPA, as a basis for his computation of aircraft emissions at CMH for inclusion in the SIP revision.





Mr. Bill Spires confirmed that no additional years of analysis would be required in the CMH EIS relevant to $PM_{2.5}$ nonattainment in Franklin County. In addition, Mr. Spires stated the $PM_{2.5}$ SIP revision will be submitted to USEPA in April 2008. The status of the SIP revision for the attainment of ozone is unclear at this time. Landrum & Brown will contact Ms. Sam MacDonald to get an update on the SIP submission prior to the release of the draft EIS.

With regard to the map showing the location of the air emission monitoring sites in Franklin County, shown in Exhibit 1 of the discussion outline, Mr. Chris Gawronski, MORPC, will verify that the map is still valid.

Regulatory Thresholds

Ms. Virginia Raps explained the CAA de minimis thresholds that apply to the EIS. The thresholds for both the criteria and precursor pollutants to ozone and $PM_{2.5}$ are required to be evaluated under the General Conformity Rule. Mr. Bill Spires confirmed that emissions of ammonia are not a constraining factor in Franklin County as a precursor pollutant to $PM_{2.5}$ and ammonia would not be required for evaluation in the EIS.

Ms. Raps explained the National Ambient Air Quality Standards (NAAQS) that will apply to the project. The information in Table 1 of the discussion outline shows that the background concentrations for $PM_{2.5}$ already exceed the NAAQS under existing conditions. Both OEPA and USEPA expect the $PM_{2.5}$ NAAQS will be exceeded under the future baseline analyses, but would likely exceed to a lesser extent under the project analyses. This is because project emissions are expected to be lower than the baseline emissions due to a reduction in aircraft departure delay time under the proposed project. Therefore, it is expected that the air quality assessment will demonstrate compliance to the NAAQS as required under the National Environmental Policy Act (NEPA).

Meteorology

Ms. Raps explained the use of meteorological parameters required for the emission inventory and dispersion analysis. There was general concurrence with the data provided in Table 2 of the discussion outline, which is the average annual temperature and average annual mixing height applicable to Columbus. Mr. Bill Spires noted that the mixing height data from the Holzworth document (USEPA Report AP-101) that will be used for the emissions inventory originated from the upper-air station located at Wright-Patterson Air Force Base in Dayton. Conversely, the upper air data that will be used for the dispersion analysis was collected at the National Weather Service Office in Wilmington, Ohio.

Both OEPA and USEPA concurred, after consulting by phone during the meeting with Mr. Randy Robinson, the Regional Meteorologist for USEPA Region 5, that the five years of meteorological data that will be used for the dispersion analysis will be 2001, 2002, 2003, 2004, and 2005.

Emission Sources

There were no objections to the procedure and methodology proposed to develop the fleet of aircraft, auxiliary power units (APUs), and ground support equipment (GSE) for existing conditions, and which will be used to develop the fleet for years 2009, 2010, 2012, and 2018.

Although an accounting of the vehicles accessing the airport is available in the four documents referenced in the discussion document, the distribution of the vehicles in parking lots, garages, and curb access is not readily apparent. Therefore, Mr. Dave Wall, CRAA, and Ms. Raps will consult at a future time to discuss vehicle distribution throughout the terminal core. Mr. Wall also informed the group that the 17th Avenue parking lot will be implemented in June 2007. Therefore, the use of the parking lot will not be included in the analysis of existing conditions but will be included in the analysis of all the future baseline and project alternatives.

Ms. Sam MacDonald will provide information for inclusion in the MOBILE6 input files used for the assessment of emissions from motor vehicles.

Dispersion Analysis

There was extended discussion of the procedure to determine the number and location of discrete receptors and the worst-case meteorological years for dispersion analysis.

The evaluation process that will determine the worst-case meteorological years and the reduced set of discrete receptors must be completed by July 19, 2007, to meet the EIS schedule for delivery to the FAA. The final number and location of discrete receptors will be determined by the FAA project manager, Ms. Katherine Jones, following consultation with OPEA, USEPA, CRAA, and MORPC. Mr. Bill Spires recommended the following procedure:

First, conduct dispersion analysis of existing conditions using the entire set of over 100 receptors, and apply all five years of meteorological data to all pollutants and averaging periods. Evaluation of the results of the analyses will reveal the "hot spots" at the airport and the location of the reduced set of receptors will be identified.

Second, the dispersion analysis conducted for the first step will be used to also determine the worst-case meteorological year for each pollutant. For pollutants requiring two averaging periods, for instance, the 24-hour and annual average concentration of $PM_{2.5}$, one averaging period will be identified as the "controlling" average and the worst-year will be identified relative to that averaging period for that pollutant. In this way, one specific year will be identified for each pollutant as the worst-case year for carbon monoxide (CO), fine particulate matter ($PM_{2.5}$), coarse particulate matter ($PM_{10}$), nitrogen oxides ($NO_x$), and sulfur oxides ($SO_x$). Using this methodology, only one year of meteorological data will be applied in dispersion modeling; however, the year may differ depending on the pollutant.





Third, all the future baseline and alternative analyses (2012 and 2018) will be run with the reduced set of receptors with the application of the worst-case year of meteorological data corresponding to the pollutant.

Lastly, following the review of the draft EIS, when the preferred alternative is identified by the FAA, the dispersion analysis of the preferred alternative will conducted using the entire set of over 100 receptors, and will be run for all years and all pollutants and averaging periods.

Construction

Mr. Dave Wall stated that construction will begin in 2009 for a very small portion of the proposed project and main construction projects will begin in 2011, continuing through 2012. Mr. Wall will provide information regarding timing for the construction of the runway to Landrum & Brown.

Mr. Wall stated that the crossover taxiway currently under construction will be implemented in 2009. Therefore, the use of the taxiway will not be included in the analysis of existing conditions but will be included in the future baseline and project alternative analyses. Use of the new taxiway is expected to reduce average taxi time at the airport and this reduction was accounted for in the CRAA planning study (refer to Section VI-1 of the discussion document).

Data Requirements

A summary of the outstanding data requirements is given in the table below. All data should be provided in written form through e-mail to:

Ms. Virginia Raps
Landrum & Brown Air Quality Manager
graps@landrum-brown.com
Work: 513-530-1238
Fax: 513-530-2238

***All data requested at this meeting should be provided as directed above no later than July 19, 200, except where noted in the table below.***

| DATA REQUIREMENT AND COORDINATION | CONTACT PERSON/AGENCY | ANALYSIS TYPE AND YEAR | DATE REQUIRED |
|---|---|---|---|
| CMH Emissions Budget in the SIP | Bill Spires OEPA | Emission inventory for milestone years | July 19, 2007 **This information was provided following the meeting.** |
| Confirm the validity of the air quality monitoring sites, shown in Exhibit 1 of the discussion outline. | Chris Gawronski MORPC | Current monitoring sites | July 19, 2007 **This information was provided following the meeting.** |
| MOBILE 6 input file instructions. | Sam MacDonald, OEPA | Emission inventory and dispersion, all years, all alternatives | July 19, 2007 |
| Determination of worst-case meteorological years and the set of discrete receptor locations | Bill Spires, OEPA, and Katy Jones, FAA | Dispersion analysis, existing conditions | As soon as possible |

Next Steps

Your comments or requests relating to this scoping meeting should be provided ***in writing to the FAA no later than July 19, 2007***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174

**Email:** CMHEIS@FAA.GOV

**Website:** www.Airportsites.net/CMH-EIS





## ATTACHMENT A

## MEETING PARTICIPANTS

The following is a list of the meeting participants, which attended either in person or by teleconference.

| | |
|---|---|
| **Name:** | Mr. Bill Spires, C.C.M. |
| **Title:** | Manager, SIP Section |
| **Agency/Division/Firm** | OEPA Division of Air Pollution Control |
| **Mailing Address** | 50 West Town Street<br>Columbus, OH 43215 |
| **E-mail Address:** | bill.spires@epa.state.oh.us |
| **Telephone Number:** | 614-644-3618 |
| **FAX Number:** | 614-644-3681 |
| **Name:** | Ms. Sam MacDonald |
| **Title:** | Environmental Specialist 2 |
| **Agency/Division/Firm** | Ohio EPA/Division of Air Pollution Control |
| **Mailing Address** | 50 W. Town St.<br>Columbus, OH 43215 |
| **E-mail Address:** | sam.macdonald@epa.state.oh.us |
| **Telephone Number:** | 614-728-1743 |
| **FAX Number:** | 614-644-3681 |
| **Name:** | Ms. Sarah Hedlund |
| **Title:** | Air Quality Modeler |
| **Agency/Division/Firm** | OEPA |
| **Mailing Address** | 50 W. Town Street Suite 700<br>Columbus, OH 43215 |
| **E-mail Address:** | sarah.hedlund@epa.state.oh.us |
| **Telephone Number:** | 614-644-3632 |
| **FAX Number:** | 614-644-3681 |

| | |
|---|---|
| **Name:** | Mr. Christopher Gawronski |
| **Title:** | Principal Planner |
| **Agency/Division/Firm** | Mid-Ohio Regional Planning Commission (MORPC) |
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| **FAX Number:** | 312-886-0617 |

| | |
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| **FAX Number:** | 513-530-2238 |





**ATTACHMENT B**

**ELECTRONIC FILES**

The following electronic files are attached:

- Original Agenda
- Original Discussion Outline
- Revised Discussion Outline (includes comments received following the meeting and prior to the distribution of this document)
- FAA October 17, 2006 letter to USEPA in response to comments relating to the Air Quality Scoping Meeting, July 19, 2006

# Port Columbus International Airport Environmental Impact Statement

# Discussion Outline

Revision

## Air Quality Scoping Meeting

Location: Ohio Environmental Protection Agency (OEPA)
6th Floor, Conference Room "B"
122 South Front Street
Columbus, OH 43216

Date: Tuesday, June 19, 2007
Time: 9:00 a.m. – 12:00 noon EDT

**Prepared for:**

Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Romulus, Michigan 48174

**Prepared by:**

Landrum & Brown, Since 1949

Landrum & Brown, Incorporated
11279 Cornell Park Drive
Cincinnati, OH 45242



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# I. INTRODUCTION

The Federal Aviation Administration (FAA) is preparing an Environmental Impact Statement for the Port Columbus International Airport (CMH EIS or airport). As the airport sponsor, the Columbus Regional Airport Authority (CRAA) proposes a Federal action to replace Runway 10R/28L with a new runway of approximately the same length. The new runway is proposed to be relocated south of the existing Runway 10R/28L to allow for passenger terminal expansion that will accommodate future aviation demand at the airport. At this time, the FAA intends to include a review of air quality impacts in the CMH EIS under the following cases:

- 2006 Existing Conditions
- 2009 Project for SIP eight-hour ozone attainment year, inventory only[1]
- 2010 Project for SIP one-hour ozone budget (milestone) year, inventory only[1]
- 2012 Baseline
- 2012 Project Alternatives
- 2018 Baseline
- 2018 Project Alternatives

This air quality scoping meeting continues the process of engaging the participation of the Federal, State, and local air quality agencies concerned with the thorough assessment of air quality impacts for the CMH EIS. The coordination effort will be documented in a Draft Air Quality Approach Technical Report, which will be included in the Draft EIS during the public comment period.

The goal of this air quality scoping meeting is to:

- Confirm the requirements for analysis relating to the provisions of the SIP
- Obtain concurrence on data development, procedures, and methodology planned for computer modeling
- Determine whether there are any outstanding data required for the modeling effort

1 The first year of proposed project implementation is not until 2012. However, construction is anticipated to begin in 2009. Therefore, the 2009 and 2010 emission inventories would include estimated construction emissions.





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The objective of this air quality scoping meeting is to engage the participants in a general discussion of:

- Proposed Project
- Ohio State Implementation Plan (SIP) for Franklin County
- Applicable regulatory thresholds
- Meteorology used for the emission inventory and dispersion modeling
- Overview of emission sources
- Overview of dispersion analysis
- Procedure for the construction emissions inventory
- Identification of any outstanding data needs

# II. PROPOSED PROJECT

The airport currently has a set of parallel runways as shown in the photograph in Figure 1. The shorter Runway 10L/28R, located north of the passenger terminal area, is 8,000 feet long. The longer Runway 10R/28L is located south of the terminal core and is 10,125 feet long.


**FIGURE 1.** Aerial photograph of CMH showing the existing runways, the approximate location of the replacement runway (dotted line), and the orientation to north. **REVISION: Both alternatives (702-foot shift and 800-foot shift) for the proposed replacement runway are illustrated. Positions are approximate.**

The proposed project includes:

- Relocation of Runway 10R/28L to the south
- Construction of additional taxiways to support the replacement runway
- Installation of navigational aids (NAVAIDS)
- Terminal development
- Roadway improvements in the terminal core
- Parking facility improvements
- Development of air traffic operational procedures for the replacement runway
- Proposed Part 150 noise abatement actions to be implemented upon receipt of the Record of Approval.

# III. OHIO SIP

The Ohio SIP is included in the Ohio Administrative Code,[2] (OAC) Chapter 3745, which incorporates, by reference, the requirements under the National Environmental Policy Act (NEPA)[3] and the provisions of the Clean Air Act, including the 1990 Amendments (CAA).[4] According to the Ohio SIP, Franklin County is designated nonattainment for ozone and fine particulate matter ($PM_{2.5}$). Two documents were referenced for information regarding the expected attainment years in Franklin County, and the emission budgets for the milestone years:

- Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the Franklin, Delaware, Licking, Fairfield, Madison, and Knox County Ozone Non-Attainment Area, prepared by the Mid-Ohio Regional Planning Commission (MORPC), dated April 28, 2005, referred to in this document as the Ozone Determination.

- Central Ohio PM2.5 Air Quality Analysis: Air Quality Conformity Determination Documentation for the Franklin, Delaware, Licking, Fairfield, and Coshocton (Franklin Twp) County PM2.5 Non-Attainment Area, prepared by MORPC, dated February 9, 2006, referred to in this document as the $PM_{2.5}$ Determination.

2 Ohio Administrative Code (OAC) Chapter 3745-21-02 *Ambient Air Quality Standards and Guidelines*, November 5, 2002 available on the Internet at http://onlinedocs.andersonpublishing.com/oh /lpExt.dll?f=templates&fn=main-h.htm&cp=PORC.

3 Ohio Administrative Code (FAC), Chapter 62-204.800, *Federal Regulations Adopted by Reference*, incorporated the NAAQS into the Ohio SIP.

4 Ohio Administrative Code (OAC) Chapter 3745-101-20 *Savings Provisions*, December 31, 2004, available on the Internet at http://onlinedocs.andersonpublishing.com/oh /lpExt.dll?f=templates&fn=main-h.htm&cp=PORC.





According to the Ozone Determination, Section II, *Analysis Years*, an emission analysis is required for the eight-hour ozone attainment year, 2009, and the one-hour ozone budget (milestone) year, 2010. The budget for volatile organic compounds (VOC) and nitrogen oxides ($NO_x$) emissions to meet the 2010 milestone target is found in Section II, *Background*, Table 1, *Emission Inventory and SIP Budgets for the Columbus Maintenance Area*, as reproduced in Figure 2. There is no emission budget for the attainment year 2009. **(REVISION: Note – Since the time of the June 19 meeting, OEPA has provided FAA with the CMH emissions that were included in the 2005 SIP inventory.)**

**Table 1: Emission Inventory and SIP Budgets for the Columbus Maintenance Area**

| | VOC in tons/day | | | | NOx in tons/day | | | |
|---|---|---|---|---|---|---|---|---|
| | Point | Area | Mobile | Total | Point | Area | Mobile | Total |
| 1990 Inventory | 16.44 | 101.18 | 94.73 | 212.35 | 13.79 | 96.68 | 78.65 | 189.12 |
| 1996 Inventory | 17.52 | 107.47 | 63.36 | 188.35 | 14.35 | 102.62 | 68.85 | 185.82 |
| 2005 Budget | 19.33 | 117.30 | 61.38 | 198.01 | 15.27 | 111.82 | 61.24 | 188.33 |
| 2010 Budget | 20.27 | 123.94 | 67.99 | 212.20 | 12.17 | 101.99 | 70.99 | 185.15 |
| | 2010 Safety Margin | | | 0.15 | 2010 Safety Margin | | | 3.97 |

**FIGURE 2.** Emission inventory SIP budget obtained from the Ozone Determination. Source: MORPC, *Central Ohio Air Quality Analysis: Air Quality Conformity Determination Documentation for the Franklin, Delaware, Licking, Fairfield, Madison, and Knox County Ozone Non-Attainment Area*, April 28, 2005.

Also stated in the Ozone Determination, the U.S. Environmental Protection Agency (USEPA) MOBILE6.2 program was used to generate the emission factors for motor vehicles for the conformity analysis. The MOBILE6.2 input and output files, along with the reference files required to run the emission factor calculations for Franklin County, were provided to the FAA consultant by MORPC.[5]

According to the $PM_{2.5}$ Determination, Section II, *Analysis Years*, the years for analysis required for the $PM_{2.5}$ nonattainment area are 2020 and 2030. Both years are beyond the farthest planning year for the CMH EIS, which is 2018. In Section III, *Emission Projections*, of the same document, ~~MROPC~~ **MORPC** states there is "not yet a SIP with emission budgets" for emissions of $PM_{2.5}$.

5 MOBILE6.2 files were provided to Landrum & Brown, via an e-mail transmission from Ms. Chandra Parasa, MORPC, on April 9, 2007.

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# IV. REGULATORY THRESHOLDS

The assessment of air quality will be prepared in accordance with the guidelines provided in the FAA *Air Quality Procedures for Civilian Airports & Air Force Bases,*[6] and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, which together with the guidelines of FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, constitutes compliance to all the relevant provisions of NEPA, the CAA, and the Ohio SIP.

The General Conformity Rule, established under CAA, would apply to the project proposed for the CMH EIS. Therefore, ***an inventory of net emissions* will be prepared** for comparison to the relevant de minimis thresholds given under 40 CFR Part 93. Net emissions would be calculated by comparing the inventory of the "no-build" versus the "build" emissions for 2009, 2010, 2012, and 2018, in addition to the year of greatest emissions, which has not yet been determined. The relevant de minimis thresholds applicable to the project proposed in the CMH EIS are ***100 tons per year for each*** of the following criteria and precursor pollutants:

- $PM_{2.5}$
- $NO_x$
- VOC
- $SO_x$

Emissions of $NO_x$ and VOC are considered precursors to ozone development, and emissions of sulfur oxides ($SO_x$), along with $NO_x$, are considered precursors to the development of $PM_{2.5}$ in the atmosphere.

Pursuant to NEPA guidelines and 40 CFR Part 93, ***dispersion analysis will be conducted*** for the air quality assessment of the project proposed for the CMH EIS. The computer modeling results will be added to the background concentrations of the criteria pollutants to determine the project's design concentrations. The background concentrations in Franklin County, which were provided to the FAA consultant by MORPC,[7] are summarized in **Table 1**. The associated National Ambient Air Quality Standards (NAAQS) are also provided for comparison. A map of the location of the five monitoring sites that recorded data for the development of the background concentrations in Franklin County is presented in **Exhibit 1, *Central Ohio Air Quality Monitoring Sites***.

6 FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
7 Background concentration data were provided to Landrum & Brown, via an e-mail transmission from Ms. Sarah Hedlund, Ohio EPA, during May 2007.





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**TABLE 1**
**FRANKLIN COUNTY BACKGROUND CONCENTRATIONS**

| CRITERIA POLLUTANT | AVERAGING PEROD | CONCENTRATION (μg/m³) | NAAQS (μg/m³) |
|---|---|---|---|
| CO | 1-Hour | 4,796.4 | 40,000 |
| | 8-Hour | 2,284 | 10,000 |
| $NO_x$ | Annual | 39 | 100 |
| $PM_{10}$ | 24-Hour | 85 | 150 |
| $PM_{2.5}$ | 24-Hour | 52.1 | 35 |
| | Annual | 16.67 | 15 |
| $SO_x$ | 24-Hour | 73.36 | 365 |
| | Annual | 10.74 | 80 |

Source: Ohio EPA, May 2007.
40 CFR Part 50.
Landrum & Brown analysis, 2007.

# V. METEOROLOGY

The emission inventory will be prepared using the FAA Emissions and Dispersion Modeling System Version 4.5 (EDMS). The inventory calculations require the average annual temperature and the average annual mixing height. The values are provided in **Table 2, *Meteorological Parameters for the Emission Inventory***.

Dispersion analysis of the criteria pollutant emissions calculated for the emission inventory will also be conducted using EDMS. The dispersion calculations require one full year of meteorological data that includes several parameters such as temperature, pressure, wind speed, and wind direction for each hour of the year. Hourly surface aviation meteorological data obtained from the National Climatic Data Center (NCDC) for the Port Columbus International Airport for 2005[8] will be used for existing conditions. The upper air data required for the analysis was also obtained from NCDC for the nearest upper-air station to the airport, which is the Wilmington National Weather Service Office. Refer to **Table 3, *Meteorological Data for Dispersion Analysis.***

8 Year 2005 meteorological data was the most recent credible database available.

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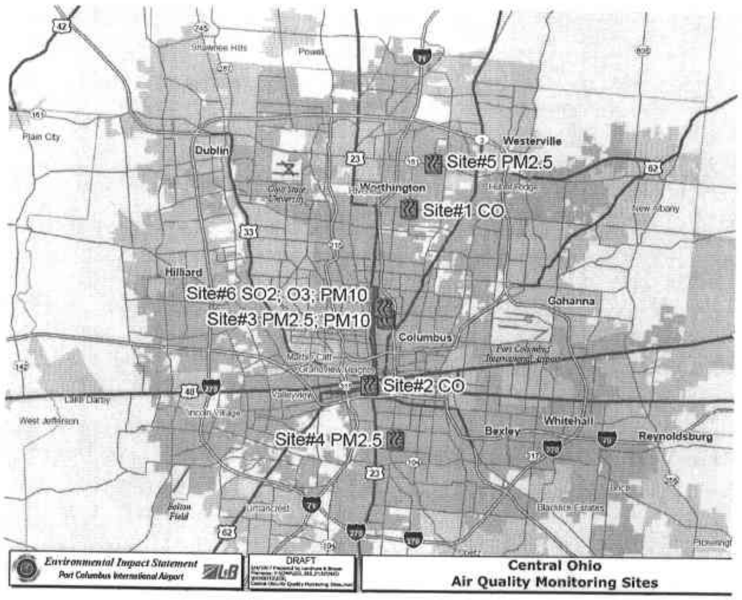


**EXHIBIT 1.** Central Ohio Air Quality Monitoring Sites.
Source: MORPC, http://airquality.morpc1.org/sitemap.cfm
Landrum & Brown analysis, 2007.





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**TABLE 2**
**METEOROLOGICAL PARAMETERS FOR THE EMISSION INVENTORY PORT COLUMBUS INTERNATIONAL AIRPORT**

| METEROLOGICAL PARAMETER | VALUE | SOURCE |
|---|---|---|
| Average Annual Temperature | 52.9 Deg. F | 1971-2000 NCDC Normals for Columbus WSO Airport, OH (COLUMBUS INTL AP, FRANKLIN CO.), *Historic Climate Data: Temperature Summary*, Midwestern Regional Climate Center, U.S. Cooperative Network, a cooperative program of the Illinois State Water Survey and the National Climatic Data Center (NCDC), http://mcc.sws.uiuc.edu/climate_midwest/historical/temp/oh/331786_tsum.html |
| Average Annual Mixing Height | 3,052 feet | USEPA, Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States, AP-101, January 1972, Table B-1, *Mean Seasonal and Annual Morning and Afternoon Mixing Heights and Wind Speeds for NOP and All Cases.* |

Note: WSO is Weather Service Office.
NOP refers to no precipitation.
Deg. F refers to degrees Fahrenheit.

According to the letter from Ms. Katherine Jones, FAA Community Planner, dated October 17, 2006,[9] a teleconference was held October 2, 2006, to determine the number of years of meteorological data would be applied to dispersion modeling for the CMH EIS. **(REVISION: Note - A copy of Ms. Jones October 2006 letter is attached; reference Comment #1 of the memorandum attached to the letter, which relates to meteorological data.)** According to the minutes summarizing the teleconference proceedings:

> "The modeling is done with 5 years of met data for the base case. Then the worst-case year is chosen and used to evaluate the alternatives in the EIS. When the final alternative is chosen, then the alternative is run with the 5 years of met data. USEPA and the Ohio Environmental Protection Agency (OEPA) concurred with this approach."

[9] Letter from Ms. Katherine S. Jones, FAA Community Planner, to Ms. Sherry Kamke, Environmental Scientist, USEPA Region 5, dated October 17, 2006, with attached minutes summarizing the teleconference held October 2, 2006.

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**TABLE 3**
**METEOROLOGICAL DATA FOR DISPERSION ANALYSIS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| DATA REQUIREMENT | ANNUAL NUMBER OF OBSERVATIONS | SOURCE |
|---|---|---|
| Year 2005 Hourly Surface Aviation Observations | 8,760 | National Climatic Data Center (NCDC) for Port Columbus International Airport, collected by the National Weather Service, Columbus, Ohio. |
| Year 2005 Upper-Air Observations | 730 | National Climatic Data Center (NCDC), collected by the National Weather Service, Wilmington, Ohio. |

The identification of the specific five years of meteorological data that will be applied to dispersion modeling for this project has not been determined. The FAA would request guidance from USEPA and OEPA regarding the required years of data for analysis. Further, suggestions from USEPA and OEPA for a methodology to determine the worst-case data year is requested.

# VI. EMISSION SOURCES

The emission inventory will be prepared for each of the scenarios listed under Section I, *Introduction*. Several types of emission sources will be evaluated for the emission inventory; the identical sources will be analyzed through dispersion analysis. The sources include:

- Aircraft
- APUs (auxiliary power units)
- Ground support equipment (GSE)
- Motor vehicles in parking lots and parking garages
- Motor vehicles on airport access roadways
- Stationary sources, including fuel tank storage, deicing, emergency generators, boilers, an incinerator, and painting operations





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## VI-1. Aircraft, APUs, and GSE

The aircraft fleet will be based on the fleet evaluated for the noise analysis except airframe and aircraft engine substitutions will be necessary to match the units available in the EDMS database. The aircraft and engine types that will be used for analysis of existing conditions are given in **Table 4**.

For the emission inventory, the computer model requires the combined average ground taxi and ground delay time. This information was obtained from the *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*.[10] The data from Table 2-11 of the planning report will be used as a basis for developing data for taxi time and delay under the existing and future baseline airfield configuration and the future proposed configuration. The data from Table 2-11 is reproduced in **Figure 3**.

**TABLE 2-11**
**COMPARISON OF DAILY VFR AND IFR**
**AVERAGE ARRIVAL AND DEPARTURE TIMES**
**2023 BASELINE SCENARIO**

| Baseline Scenario | | Average Arrival Time (in Minutes) | | | Average Departure Time (in Minutes) | |
|---|---|---|---|---|---|---|
| | | Air Delay | Ground Delay | Ground Taxi | Ground Queue Delay | Ground Taxi |
| VFR | Existing Airfield | 0.6 | 0.0 | 3.8 | 1.3 | 8.6 |
| | Proposed Airfield | 0.6 | 0.0 | 3.7 | 1.3 | 8.8 |
| IFR | Existing Airfield | 0.8 | 0.0 | 3.9 | 7.6 | 9.0 |
| | Proposed Airfield | 0.7 | 0.0 | 3.8 | 5.9 | 9.2 |

Source: TransSolutions, Inc., 2005.

**FIGURE 3.** Average airport taxi and delay times.
Source: CRAA, *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*, prepared by URS, dated June 6, 2005. **REVISION: Date of final report was February 14, 2006.**

The use of APUs will be made using the EDMS default assignments. Ground support equipment was assigned based on the on-site survey completed in July 2006, and is based on aircraft type, as described in **Table 5**. The results of the survey are given in **Table 6**.

10 CRAA, *Airfield Planning Report Associated with Replacement of Runway 10R/28L at the Port Columbus International Airport*, prepared by URS, dated June 6, 2005.

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**TABLE 4**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| 550 Citation | JT15D-4 (B,C,D) | 1120 |
| 550 Citation | JT15D-4 (B,C,D) | 240 |
| 550 Citation | JT15D-4 (B,C,D) | 876 |
| 550 Citation | JT15D-4 (B,C,D) | 600 |
| 550 Citation | JT15D-4 (B,C,D) | 1818 |
| 550 Citation | JT15D-4 (B,C,D) | 2962 |
| 550 Citation | JT15D-4 (B,C,D) | 3760 |
| 550 Citation | JT15D-4 (B,C,D) | 1032 |
| A319 | V2522-A5 | 100 |
| A319 | V2522-A5 | 238 |
| A319 | V2522-A5 | 730 |
| A319 | V2522-A5 | 378 |
| A319 | V2524-A5 | 52 |
| A319 | V2524-A5 | 122 |
| A319 | V2524-A5 | 376 |
| A319 | V2524-A5 | 194 |
| A320-200 | V2500-A1 | 42 |
| A320-200 | V2500-A1 | 134 |
| A320-200 | V2500-A1 | 260 |
| A320-200 | V2500-A1 | 114 |
| A320-200 | V2527-A5 | 124 |
| A320-200 | V2527-A5 | 400 |
| A320-200 | V2527-A5 | 778 |
| A320-200 | V2527-A5 | 342 |
| Aztec | TIO-540-J2B2 | 892 |
| Aztec | TIO-540-J2B2 | 1212 |
| Aztec | TIO-540-J2B2 | 2952 |
| Aztec | TIO-540-J2B2 | 2982 |
| B737-300 | CFM56-3-B1 | 730 |
| B737-300 | CFM56-3-B1 | 2000 |
| B737-300 | CFM56-3-B1 | 5040 |
| B737-300 | CFM56-3-B1 | 2450 |
| B737-300 | CFM56-3B-2 | 98 |
| B737-300 | CFM56-3B-2 | 228 |
| B737-300 | CFM56-3B-2 | 746 |





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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| B737-300 | CFM56-3B-2 | 388 |
| B737-300 | CFM56-3C-1 (Rerated) | 158 |
| B737-300 | CFM56-3C-1 (Rerated) | 446 |
| B737-300 | CFM56-3C-1 (Rerated) | 1072 |
| B737-300 | CFM56-3C-1 (Rerated) | 514 |
| B737-500 | CFM56-3C-1 | 50 |
| B737-500 | CFM56-3C-1 | 120 |
| B737-500 | CFM56-3C-1 | 368 |
| B737-500 | CFM56-3C-1 | 190 |
| B737-700 | CFM56-7B22 | 626 |
| B737-700 | CFM56-7B22 | 1686 |
| B737-700 | CFM56-7B22 | 4328 |
| B737-700 | CFM56-7B22 | 2120 |
| B737-800 | CFM56-7B26 | 102 |
| B737-800 | CFM56-7B26 | 240 |
| B737-800 | CFM56-7B26 | 738 |
| B737-800 | CFM56-7B26 | 382 |
| B757-300 | PW2043 | 50 |
| B757-300 | PW2043 | 120 |
| B757-300 | PW2043 | 368 |
| B757-300 | PW2043 | 190 |
| BAE146-300 | LF507 SERIES | 214 |
| BAE146-300 | LF507 SERIES | 114 |
| BAE146-300 | LF507 SERIES | 372 |
| BAE146-300 | LF507 SERIES | 760 |
| BH-1900 | PT6A-67D | 116 |
| BH-1900 | PT6A-67D | 104 |
| BH-1900 | PT6A-67D | 294 |
| BH-1900 | PT6A-67D | 398 |
| Bombardier CRJ700 | CF34-8C1 | 1874 |
| Bombardier CRJ700 | CF34-8C1 | 1016 |
| Bombardier CRJ700 | CF34-8C1 | 3094 |
| Bombardier CRJ700 | CF34-8C1 | 6426 |
| Cessna 172 Skyhawk | O-320 | 1086 |
| Cessna 172 Skyhawk | O-320 | 1762 |

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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| Cessna 172 Skyhawk | O-320 | 5050 |
| Cessna 172 Skyhawk | O-320 | 3790 |
| Cessna 441 Conquest2 | TPE331-8 | 128 |
| Cessna 441 Conquest2 | TPE331-8 | 386 |
| Cessna 441 Conquest2 | TPE331-8 | 1192 |
| Cessna 441 Conquest2 | TPE331-8 | 486 |
| Cessna T337 | IO-360-B | 70 |
| Cessna T337 | IO-360-B | 178 |
| Cessna T337 | IO-360-B | 278 |
| Cessna T337 | IO-360-B | 204 |
| CITATION I SP | JT15D-1A & 1B | 74 |
| CITATION I SP | JT15D-1A & 1B | 280 |
| CITATION I SP | JT15D-1A & 1B | 818 |
| CITATION I SP | JT15D-1A & 1B | 288 |
| CL600 | ALF 502L-2 | 786 |
| CL600 | ALF 502L-2 | 440 |
| CL600 | ALF 502L-2 | 1234 |
| CL600 | ALF 502L-2 | 2652 |
| DC9-30 | JT8D-15 (old comb) | 256 |
| DC9-30 | JT8D-15 (old comb) | 674 |
| DC9-30 | JT8D-15 (old comb) | 1816 |
| DC9-30 | JT8D-15 (old comb) | 902 |
| DC9-50 | JT8D-17 (old comb) | 108 |
| DC9-50 | JT8D-17 (old comb) | 326 |
| DC9-50 | JT8D-17 (old comb) | 702 |
| DC9-50 | JT8D-17 (old comb) | 324 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 2108 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 1176 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 3380 |
| Embraer ERJ 135/140 | AE3007A1/3 (Type 3) | 7208 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 222 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 124 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 356 |
| Embraer ERJ 135/140 | AE3007A3 (Type 3) | 758 |
| Embraer ERJ 145 | AE3007A | 110 |





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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| Embraer ERJ 145 | AE3007A | 62 |
| Embraer ERJ 145 | AE3007A | 178 |
| Embraer ERJ 145 | AE3007A | 380 |
| Embraer ERJ 145 | AE3007A1E | 222 |
| Embraer ERJ 145 | AE3007A1E | 124 |
| Embraer ERJ 145 | AE3007A1E | 356 |
| Embraer ERJ 145 | AE3007A1E | 758 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 1442 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 804 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 2312 |
| Embraer ERJ 145LR | AE3007A1/1 (Type 3) | 4932 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 1774 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 990 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 2846 |
| Embraer ERJ 145LR | AE3007A1/3 (Type 3) | 6070 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 1886 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 1052 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 3024 |
| Embraer ERJ 145LR | AE3007A1P (Type 3) | 6450 |
| Embraer ERJ 170 | CF34-8E5 | 1102 |
| Embraer ERJ 170 | CF34-8E5 | 598 |
| Embraer ERJ 170 | CF34-8E5 | 1820 |
| Embraer ERJ 170 | CF34-8E5 | 3780 |
| F-27 SERIES | RDa7 | 440 |
| F-27 SERIES | RDa7 | 514 |
| F-27 SERIES | RDa7 | 1218 |
| F-27 SERIES | RDa7 | 1478 |
| Falcon 20 | CF700-2D | 68 |
| Falcon 20 | CF700-2D | 250 |
| Falcon 20 | CF700-2D | 846 |
| Falcon 20 | CF700-2D | 294 |
| Falcon 2000EX | PW308C | 214 |
| Falcon 2000EX | PW308C | 348 |
| Falcon 2000EX | PW308C | 314 |
| Falcon 2000EX | PW308C | 114 |

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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| Falcon 2000EX | PW308C | 372 |
| Falcon 2000EX | PW308C | 880 |
| Falcon 2000EX | PW308C | 760 |
| Falcon 2000EX | PW308C | 1,194 |
| Gulfstream II | SPEY MK511-8 | 68 |
| Gulfstream II | SPEY MK511-8 | 250 |
| Gulfstream II | SPEY MK511-8 | 846 |
| Gulfstream II | SPEY MK511-8 | 294 |
| Gulfstream IV | TAY Mk611-8 | 102 |
| Gulfstream IV | TAY Mk611-8 | 386 |
| Gulfstream IV | TAY Mk611-8 | 1,264 |
| Gulfstream IV | TAY Mk611-8 | 436 |
| HS 125 | TFE731-3 | 354 |
| HS 125 | TFE731-3 | 180 |
| HS 125 | TFE731-3 | 550 |
| HS 125 | TFE731-3 | 1,106 |
| KC-135R | TF33-P-5&9 | 102 |
| KC-135R | TF33-P-5&9 | 240 |
| KC-135R | TF33-P-5&9 | 738 |
| KC-135R | TF33-P-5&9 | 382 |
| Learjet 25C | CJ610-6 | 308 |
| Learjet 25C | CJ610-6 | 1,126 |
| Learjet 25C | CJ610-6 | 3,808 |
| Learjet 25C | CJ610-6 | 1,328 |
| Learjet 35/36 | TFE 731-2-2B | 278 |
| Learjet 35/36 | TFE 731-2-2B | 1,042 |
| Learjet 35/36 | TFE 731-2-2B | 3,352 |
| Learjet 35/36 | TFE 731-2-2B | 1,168 |
| MD-80-82 | JT8D-217 (old comb) | 50 |
| MD-80-82 | JT8D-217 (old comb) | 120 |
| MD-80-82 | JT8D-217 (old comb) | 368 |
| MD-80-82 | JT8D-217 (old comb) | 190 |
| MD-80-83 | JT8D-219 old comb | 366 |
| MD-80-83 | JT8D-219 old comb | 1,000 |
| MD-80-83 | JT8D-219 old comb | 2,520 |





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**TABLE 4 (CONTINUED)**
**AIRCRAFT FLEET – EXISTING CONDITIONS**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| EDMS AIRCRAFT TYPE | EDMS ENGINE TYPE | ANNUAL OPERATIONS |
|---|---|---|
| MD-80-83 | JT8D-219 old comb | 1,224 |
| Navajo | TIO-540-J2B2 | 814 |
| Navajo | TIO-540-J2B2 | 900 |
| Navajo | TIO-540-J2B2 | 2,780 |
| Navajo | TIO-540-J2B2 | 2,814 |
| Piper PA-28 | O-320 | 84 |
| Piper PA-28 | O-320 | 256 |
| Piper PA-28 | O-320 | 794 |
| Piper PA-28 | O-320 | 324 |
| SF-340-B PLUS | CT7-5 | 186 |
| SF-340-B PLUS | CT7-5 | 168 |
| SF-340-B PLUS | CT7-5 | 470 |
| SF-340-B PLUS | CT7-5 | 638 |
| UC-12J | PT6A-67B | 144 |
| UC-12J | PT6A-67B | 478 |
| UC-12J | PT6A-67B | 1,078 |
| UC-12J | PT6A-67B | 490 |
| **TOTAL OPERATIONS** | | **197,122** |

**TABLE 5**
**AIRCRAFT GSE SURVEYED BY TYPE AND CATEGORY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| JET AIRCRAFT | | TURBOPROP AIRCRAFT |
|---|---|---|
| LARGE JETS | SMALLER JETS | |
| MD88 | Embraer Regional Jet | Dornier 328 |
| Boeing 737 | | Dash 8 |
| | | Saab 340 |
| | | Beech 1900 |

Note: General aviation and cargo aircraft were not surveyed.

**TABLE 6**
**AIRCRAFT GSE ASSIGNMENTS BASED ON THE SURVEY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| GSE TYPE | AIRCRAFT TYPE (minutes per landing/takeoff cycle) | | |
|---|---|---|---|
| | LARGE JETS | SMALLER JETS | TURBOPROPS |
| Diesel Aircraft Tractor | 21 | 9 | 6 |
| Diesel Baggage Tractor | 57 | 12 | 2 |
| Gasoline Baggage Tractor | | 26 | 20 |
| Diesel Belt Loader | 46 | 28 | |
| Gasoline Belt Loader | 22 | 21 | 21 |
| Gasoline Catering Truck | 15 | | |
| Diesel Fuel Truck | 20 | 11 | 10 |
| Electric GPU Hookup (400 Hz) | | | 30 |

Note: EDMS default assignments were used for general aviation GSE and cargo GSE.





## VI-2. Motor Vehicles in Parking Lots and Garages

Data relating to motor vehicles utilizing the airport's parking lots and garages was obtained from the following sources:

- *International Gateway Realignment, Categorical Exclusion Reevaluation Level 4*, prepared for the Ohio Department of Transportation, District 6, dated August 2006.
- *Traffic Impact Study: 17th Avenue Parking Lot*, prepared for the CRAA, preliminary report dated October 19, 2006.
- *Traffic Impact Study: New Employee Parking Lot*, prepared for the CRAA, preliminary report dated October 19, 2006.
- *Rental Car Update & Analysis*, prepared for the CRAA, dated February 2005.

A diagram of the parking lots and garages that were considered for analysis is presented in **Exhibit 2, *Parking Lots and Garages – Mobile Sources***.

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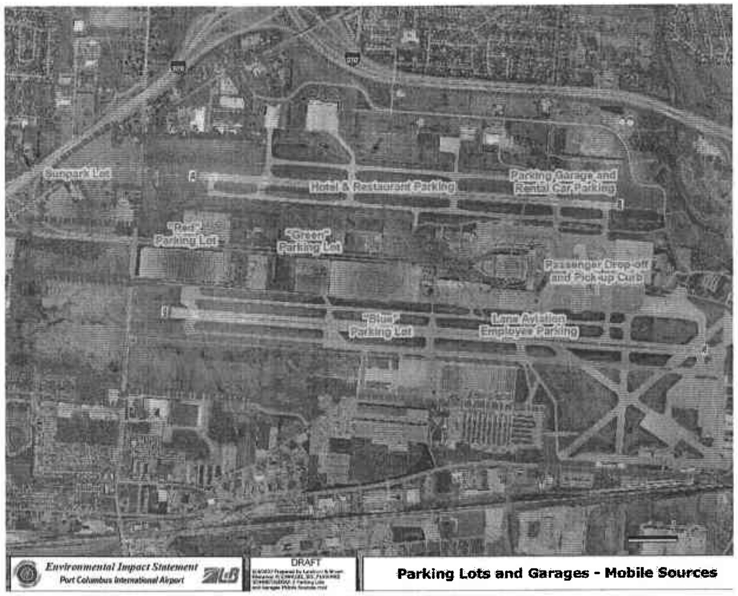


**EXHIBIT 2.** Location of parking lots and garages at the airport.
Source: Landrum & Brown analysis, 2007.

**Revision: Correct the label shown for "Lane Aviation Employee Parking" to "Lane Aviation Parking."**





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### VI-3. Motor Vehicles on Roadways

Data relating to motor vehicles traversing the airport's access roadways was obtained from the same sources used for parking lots and garages.

A diagram of the airport's access roadways that were considered for analysis is presented in **Exhibit 3, *Location of Roadways***. Not all the roadways will be represented in the final document if data is not available.

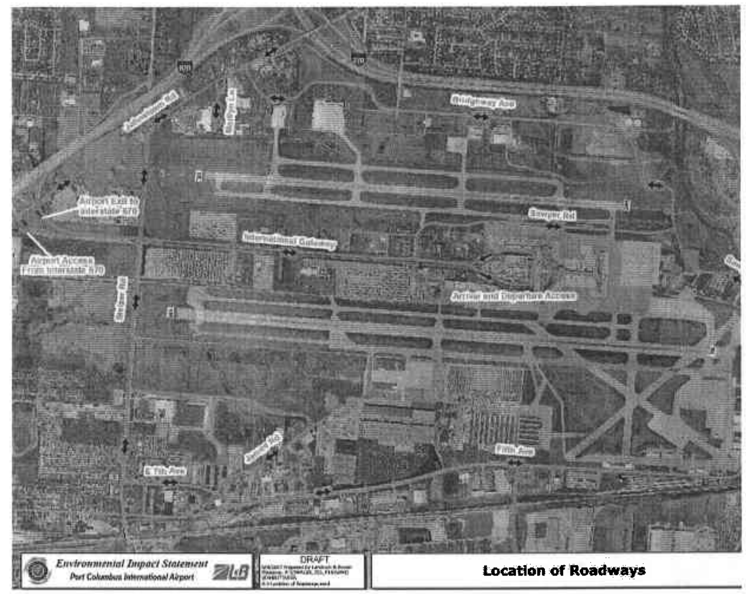


**EXHIBIT 3.** Location of roadways at CMH considered for inclusion in computer air quality modeling.
Source: Landrum & Brown analysis, 2007.

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## VI-4. Stationary Sources

Stationary sources of emissions were identified based on the on-site survey completed in July 2006. The sources identified in the survey are given in **Table 7**. The location of the stationary sources inventoried in the survey is presented in **Exhibit 4, *Location of Stationary Sources***.

**TABLE 7**
**STATIOINARY SOURCES INVENTORY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| MAP ID | STATIONARY SOURCE | TYPE |
|---|---|---|
| 1 | Concourse A | Emergency Generator W/ Diesel Fuel Tank |
| 2 | Concourse B Diesel | Emergency Generator W/ Diesel Fuel Tank |
| 3 | Concourse B Natural Gas | Natural Gas Boiler |
| 4 | Concourse C | Emergency Generator W/ Diesel Fuel Tank |
| 5 | PEA | Natural Gas Boiler |
| 6 | Lane Corridor A | Natural Gas Boiler |
| 7 | Lane Hangar 3 | Natural Gas Boiler |
| 8 | Lane Hangar 4 | Natural Gas Boiler |
| 9 | Lane Hangar 5 | Natural Gas Boiler |
| 10 | Backup IT | Emergency Generator W/ Diesel Fuel Tank |
| 11 | Backup Concourse A | Natural Gas Boiler |
| 12 | Backup Concourse C | Emergency Generator W/ Diesel Fuel Tank |
| 13 | Misc. Concourse B | Emergency Generator W/ Diesel Fuel Tank |
| 14 | Backup Garage | Emergency Generator W/ Diesel Fuel Tank |
| 15 | Backup ARFF | Emergency Generator W/ Diesel Fuel Tank |
| 16 | Aircraft Deice PG TI | Deice Area |
| 17 | Aircraft Deice EG | Deice Area |
| 18 | Airfield Maintenance Gas | Gasoline Storage Tank |
| 19 | Airfield Maintenance Diesel | Diesel Fuel Storage Tank |
| 20 | Lane - Jet A | Jet A Storage Tanks |
| 21 | Lane Diesel | Diesel Fuel Storage Tank |
| 22 | Lane Gasoline | Gasoline Storage Tank |
| 23 | Incinerator | Incinerator |
| 24 | Air Deice PG TIV | Deice Area |
| 25 | Lane 100LL | Avgas Storage Tanks |
| 26 | Runway Deice KOAC | Deice Area |
| 27 | Million Air Jet A | Jet A Storage Tanks |
| 28 | Million Air Diesel | Diesel Fuel Storage Tank |
| 29 | Million Air Av Gas | Aviation gasoline (AvGas) Storage Tank |



Federal Aviation Administration
Environmental Impact Statement
Port Columbus International Airport

Air Quality Scoping Meeting
Discussion Outline
June 19, 2007

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**TABLE 7 (CONTINUED)**
**STATIOINARY SOURCES INVENTORY**
**PORT COLUMBUS INTERNATIONAL AIRPORT**

| MAP ID | STATIONARY SOURCE | TYPE |
|---|---|---|
| 1 | Concourse A | Emergency Generator W/ Diesel Fuel Tank |
| 30 | 45 Hotel Jet A | Jet A Storage Tanks |
| 31 | Alamo Gasoline (not in use) | Gasoline Storage Tank |
| 32 | Dollar Gasoline | Gasoline Storage Tank |
| 33 | Englefield Gasoline | Gasoline Storage Tank |
| 34 | Englefield Gasoline | Gasoline Storage Tank |
| 35 | Englefield Gasoline | Gasoline Storage Tank |
| 36 | Englefield Diesel (airport is not a customer) | Diesel Fuel Storage Tank |
| 37 | Englefield Kerosene (airport is not a customer) | Kerosene Storage Tank |
| 38 | FAA Control Tower | Emergency Generator W/ Diesel Fuel Tank |
| 39 | Hertz Gasoline | Gasoline Storage Tank |
| 40 | NetJets Diesel | Emergency Generator W/ Diesel Fuel Tank |
| 41 | Quick Turnaround Gasoline | Gasoline Storage Tanks |
| 42 | Avis Gasoline | Gasoline Storage Tank |
| 43 | National Gasoline | Gasoline Storage Tank |
| 44 | FAA ASR-9 | Emergency Generator W/ Diesel Fuel Tank |
| 45 | Flight Safety | Emergency Generator W/ Diesel Fuel Tank |
| 46 | Lift Station | Emergency Generator W/ Diesel Fuel Tank |
| 47 | Electrical Vault | Emergency Generator W/ Diesel Fuel Tank |
| 48 | NetJets | Emergency Generator W/ Diesel Fuel Tank |
| 49 | Nationwide | Emergency Generator W/ Diesel Fuel Tank |
| 50 | North Fuel Farm | Jet A Storage Tanks |

**REVISION: Add Nationwide Fuel Farm in addition to the emergency generator located at Location ID 49.**

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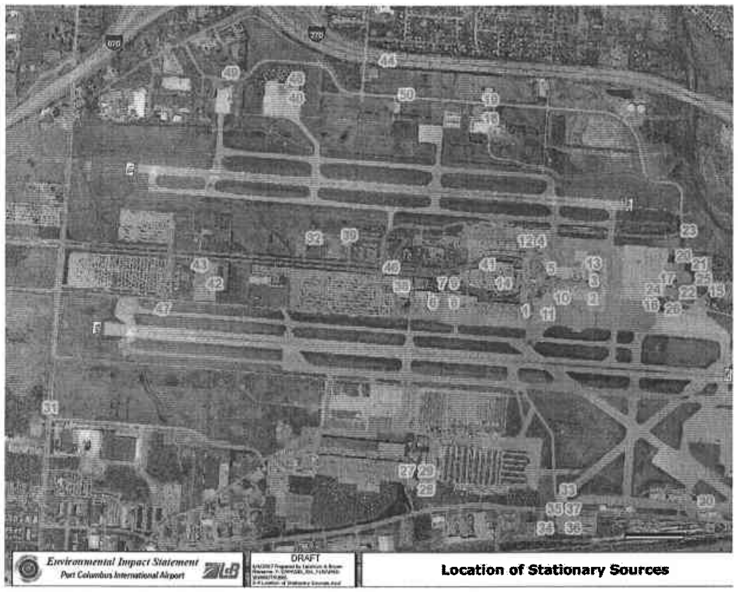


**EXHIBIT 4**. Location of stationary sources identified in the on-site survey.
Source: Landrum & Brown analysis, 2007.
**REVISION: Add to Exhibit 4 the location of the Nationwide fuel farm as a post-2006 facility.**





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# VII. DISPERSION ANALYSIS

The dispersion analysis will be conducted for the criteria pollutants (excluding ozone and lead, and not including VOC) using the EDMS. Dispersion modeling will be applied to all the scenarios listed in Section I, *Introduction*, except the 2009 and 2010 SIP years, which require an emission inventory and not dispersion modeling. The same sources evaluated for the emission inventory described in Section VI, *Emission Sources*, will be evaluated through dispersion modeling.

## VII-1 Aircraft

Aircraft for each of the scenarios will be assigned to a gate area, grouped by runway end, and will include the taxi path to and from the runway end. Three general gate areas were identified, the terminal gates, the cargo area, and the general aviation ramp. Taxi paths will be determined by assigning the longest (worst-case) path from each runway end to and from the associated gate area. Each aircraft will be assigned to a runway end according to the runway use distribution described for the noise analysis.

## VII-2 Receptors

Over 100 receptors will be assigned for dispersion modeling for the existing conditions. The receptors are shown in **Exhibit 5**, ***Airport and Parking Lot Dispersion Receptor Locations***, and **Exhibit 6**, ***Terminal Area Dispersion Receptor Locations***. Following the identification of the worst-case weather year, dispersion modeling will be applied to no more than five discrete receptors. **(REVISION: Note - A copy of the FAA letter from Ms. Katherine Jones to USEPA, dated October 17, 2006, is attached; reference Comment #2 of the memorandum attached to the letter, which relates to discrete receptors.)**

The first array of receptors will be located every ten degrees around the airport property line perimeter, beginning at 360 degrees, as measured from the airport reference point. Another ring of receptors will be located outward 1,500 feet, and a third ring of receptors will be located 1,500 feet further out from the property line. Additional receptors will be placed in the parking areas as shown in Exhibit 5.

A second grid of receptors will be located across International Gateway from Stelzer Road to the parking garage adjacent to the terminal. This grid is illustrated in Exhibit 6.

The identification of the discrete receptors that will be applied to the dispersion analysis of the project alternatives has not been determined. The FAA would request guidance from USEPA and OEPA for a methodology to determine the location of the discrete receptors.

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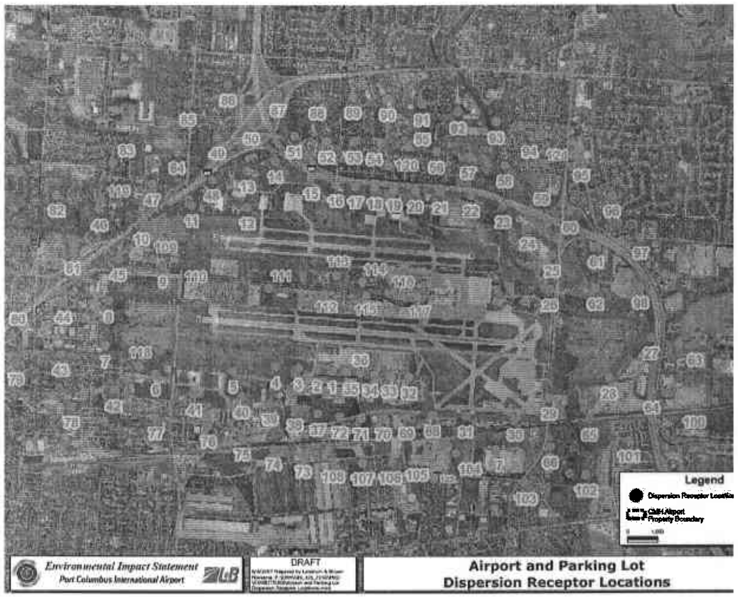


**EXHIBIT 5**. Location of airport and parking lot receptor locations.
Source: Landrum & Brown analysis, 2007.





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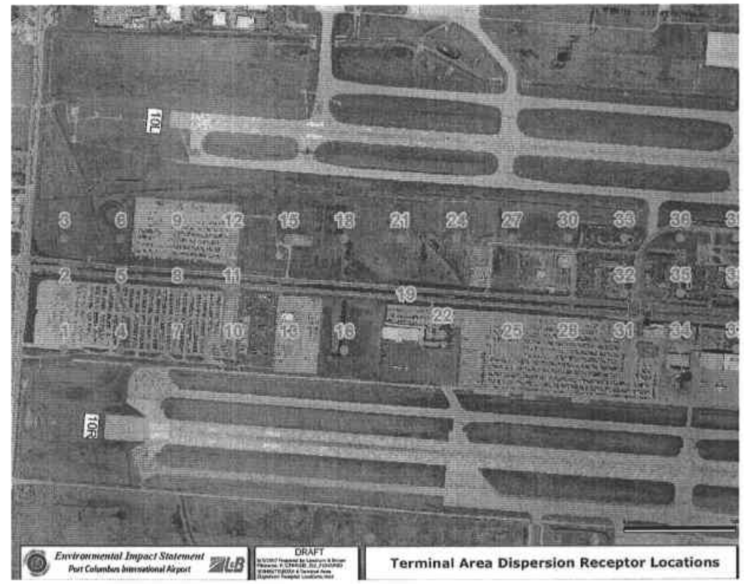


**EXHIBIT 6**. Location of the terminal area dispersion receptor locations.
Source: Landrum & Brown analysis, 2007.

# VIII. CONSTRUCTION EMISSIONS INVENTORY

The inventory of emissions from the use of construction equipment will be calculated using USEPA approved methodology. Emission factors for the Tier 2 and Tier 3 emission standards for nonroad diesel engines applicable for 2005 will be used for calculation of the inventory.[11] This allows the construction contractor the opportunity to use readily available tier-compliant equipment. **(REVISION: Note - A copy of the FAA letter from Ms. Katherine Jones to USEPA, dated October 17, 2006, is attached; reference Comment #3 of the memorandum attached to the letter, which relates to construction emissions. In the time since the meeting on June 19, CRAA has provided details concerning phasing of construction.)**

# IX. OUTSTANDING DATA NEEDS

The identification of the ***specific five years of meteorological data*** that will be applied to dispersion modeling for this project has not been determined. The FAA would request guidance from USEPA and OEPA regarding the required years of data for analysis. Further, suggestions from USEPA and OEPA for a ***methodology to determine the worst-case data year*** is requested.

The ***identification of the five discrete*** receptors that will be applied to dispersion modeling for this project has not been determined. The FAA would request guidance from USEPA and OEPA for a methodology to determine the discrete receptors.

[11] 40 CFR Part 89.





# X. NEXT STEPS

Written comments and/or questions regarding the discussion or material provided during this scoping meeting should be mailed within 30 days following the scoping meeting or no later than ***July 19, 2007***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174

**Email:** CMHEIS@FAA.GOV

**Website:** www.Airportsites.net/CMH-EIS

***This scoping document is provided as a draft and should not be considered the final authority for assessing air quality for CMH EIS. As the project progresses, changes in planning may require adjustments of the methodology and procedures given in this document.***

# AIR QUALITY COORDINATION TELECONFERENCES

**September 27, 2006 - October 17, 2006 - Letter to Ms. Sherry Kamke**
**August 8, 2007 - Meeting Minutes**
**August 10, 2007 - Meeting Minutes**
**August 22, 2007 - PowerPoint Presentation and Meeting Minutes**
**August 24, 2007 - OEPA Comment Letter**
**September 6, 2007 - FAA Letter and attachment**

U.S. Department of Transportation
Federal Aviation Administration

Detroit Airports District Office
Metro Airport Center
11677 South Wayne Road, Ste. 107
Romulus, MI 48174

October 17, 2006

Ms. Sherry A. Kamke, Environmental Scientist
NEPA Implementation Section
Office of Science, Ecosystems, and Communities
U.S. EPA Region 5
77 W. Jackson Blvd.
Mailcode: B-19J
Chicago, IL 60604-5794

Dear Ms. Kamke:

Port Columbus International Airport
Environmental Impact Statement
Air Quality Scoping Comments

This letter is in response to the comments that the U.S. Environmental Protection Agency (US EPA) submitted on August 17, 2006 for the Port Columbus International Airport Environmental Impact Statement (EIS) Air Quality Scoping.

On September 27, 2006 the Federal Aviation Administration, US EPA and Ohio EPA had a teleconference meeting to discuss the comments and work out a resolution so that the EIS could proceed. Attached are the meeting minutes that discuss the comment and the agreed to resolution of each comment.

We look forward to continuing to work with you on the EIS. Please feel free to contact me if you have any additional questions.

Sincerely,

Katherine S. Jones

Katherine S. Jones
Community Planner

Enclosure

Cc: Sarah Hedlund, OEPA
Rob Adams, Landrum & Brown
AGL-610
AGL-7 – Laura Kilpatrick
Dave Wall, Columbus Regional Airport Authority
AEE-300 – Ralph Iovinelli
APP-400 – Jake Plante



Federal Aviation Administration

# Memorandum

Date: October 2, 2006

From: Community Planner, Detroit Airports District Office DET ADO 606

To: CMH EIS Project File

Prepared by: Katherine S. Jones

Subject: Air Quality Comments Teleconference with USEPA and OEPA

A teleconference was held with the Federal Aviation Administration (FAA), U.S. Environmental Protection Agency (USEPA) – Region 5, and the Ohio Environmental Protection Agency (OEPA) regarding air quality scoping comments that were submitted by each agency. The three comments that were discussed were: the number of years of meteorological data to use in the EIS analysis, the number of receptors to use in the analysis, and construction recommendations at the time of project implementation. Following is a summary of the comment and the agreed to resolution:

1. Number of Years of Meteorological Data

U.S. EPA Comment:

The scoping information presented to date for the Columbus Airport EIS work proposes the use of one year of meteorological data as input into the EDMS dispersion model. The purpose of the dispersion modeling is to determine compliance with EPA's National Ambient Air Quality Standards (NAAQS). The Code of Federal Regulations, Part 51, Appendix W (Guideline on Air Quality Models) provides recommended approaches for regulatory modeling conducted to demonstrate compliance with the NAAQS. Section 8.3 of the Guideline discusses the need for meteorological data to be selected on the basis of spatial and temporal representativeness and further recommends five years of meteorological data be used to reasonably ensure that worst-case meteorological conditions are adequately represented in the model results. If the only representative data available is one-year of site-specific data, or if site-specific meteorological data needs to be collected, one year is adequate. However, if more than one year, up to 5 years, is available, these data are recommended for use. Given these Guideline recommendations, EPA requests that 5-years of meteorological data be evaluated in the EIS NAAQS modeling analysis to account for year-to-year variability. (Letter dated August 17, 2006)

OEPA Comment:

Landrum & Brown, contracted by the Federal Aviation Administration (FAA) for the Port Columbus International Airport EIS, has proposed to use one year of meteorological data for air dispersion modeling. Appendix W of The Code of Federal Regulations states that although only one year of site specific data is required, if more site specific data is available it also should be used in the air dispersion model input. The Ohio EPA requests that all five years of meteorological data be used in the model input to ensure that all worst case meteorological scenarios are represented. (Letter dated August 18, 2006)

Resolution:

The basis of the comment comes from CFR Part 51, Appendix W. The USEPA explained that it was hard to figure out the worst-case year without modeling the 5 years of data. It was also pointed out that this is a problem with air quality analysis at airports across the nation.

USEPA has resolved the use of the 5 years of data on airport EIS's in other regions with the following approach. The modeling is done with 5 years of met data for the base case. Then the worst- case year is chosen and used to evaluate the alternatives in the EIS. When the final alternative is chosen, then the alternative is run with the 5 years of met data.

USEPA and OEPA concurred with this approach.

2. Number of Discrete Receptors

USEPA Comment:

Also, the approach described for identifying and eliminating modeling receptors should be more fully discussed as the modeling progresses. The "Guideline" describes the receptor grid as being in sufficient detail to estimate the highest concentrations and possible violations of the NAAQS. The general approach of beginning with a large grid and refining it to a smaller number of receptors focused on the highest concentration areas is appropriate. However, the final number of receptors that will be needed cannot be predetermined but rather should be a function of what the large grid results show as well as the mix of future source emissions and scenarios. (Letter dated August 17, 2006)

OEPA Comment:

Landrum & Brown has also proposed the idea of limiting the number of receptors to five discrete receptors placed in critical areas for the future baseline and alternative model runs. Receptors analyzed in the Final EIS will be chosen based on the results from the Existing Conditions model run. The Ohio EPA requests that the number of receptors to be included in the Final EIS not be determined until after the Existing Conditions concentrations are reviewed. The results of the dispersion assessment provided in the



Draft EIS should determine how many receptors should be retained. The location of these receptors should be based on the number of hot spots, the location of any special 'sensitive' receptors and the gradient of the concentration. These locations can not be predetermined. Fenceline receptors may be included in the receptor locations the Ohio EPA requests to be further analyzed. The Ohio EPA will work in coordination with Landrum & Brown to determine the location and number of receptors that should be included in the Final EIS. (Letter dated August 18, 2006)

Resolution:

The FAA explained that the 5 receptors were placed in the scope so that initial cost estimates could be completed. When the base case analysis is completed, the FAA and their contractor will work with USEPA and OEPA to determine the location of the receptors. If it is determined at that time that more than 5 receptors are needed for the next stage of analysis, then the FAA will amend the scope to account for additional receptors.

The USEPA and OEPA concurred with this approach.

3. Construction Recommendations

USEPA Comment:

Regarding emissions from construction activity, air pollution from diesel exhaust is a public health and air quality concern. EPA lists diesel exhaust (best described by diesel PM) as a mobile source air toxic due to the cancer and noncancer health effects. A number of large construction projects (including highways and airports) recently have required diesel exhaust reduction measures in the construction specifications and we request/encourage all bidding and contract documents for the Columbus airport construction include requirements for fuel and equipment that would reduce emissions of diesel particulate matter. Diesel-powered construction equipment should be required to utilize "ultra-low sulfur diesel" (ULSD) fuel. In addition, all but the newest equipment should be retrofitted with EPA-verified technologies, e.g., oxidation catalysts or particulate filters. Contractors, subcontractors and suppliers that transport materials regularly to and from the project site should be encouraged to adopt these requirements to the best of their ability. Idling restrictions should also be built into the construction-related air quality emission reduction measures.

USEPA has case studies, listings of EPA-verified technologies, and helpful examples of contract language and specifications (including those for the O'Hare Airport Modernization Project). Staff at the USEPA Region 5 Air & Radiation Division can provide this information or you can find it at:
http://www.epa.gov/cleandiesel/construction/ and
http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm
(Letter dated August 17, 2006)

Resolution:

The FAA will provide information related to construction recommendations to the Columbus Regional Airport Authority.

The USEPA concurred with this approach.

Action Items:

The FAA will follow-up with a letter to the USEPA and OEPA regarding the resolution of these comments.

Teleconference Participants:

Katherine Jones, FAA
Sherry Kamke, USEPA
Randy Robinson, USEPA
Mike Leslie, USEPA
Suzanne King, USEPA
Sarah Hedlund, OEPA

# *Federal Aviation Administration*

## ENVIRONMENTAL IMPACT STATEMENT

**FOR**

## REPLACEMENT RUNWAY AND TERMINAL EXPANSION

**AT**

## PORT COLUMBUS INTERNATIONAL AIRPORT

### AIR QUALITY SCOPING TELECONFERENCE SUMMARY

**TELECONFERENCE CONDUCTED**

**AUGUST 8, 2007**

**10:00 A.M. – 11:00 P.M.**

The third in a series of air quality assessment scoping discussions for the Port Columbus International Airport Environmental Impact Statement (CMH EIS) was conducted on Wednesday, August 8, 2007. The web-based conference call was convened to discuss the Federal Aviation Administration's (FAA) selection of the location of the worst-case dispersion receptor at the airport under existing conditions, the location of representative community receptors, and the worst-case meteorological year, by receptor. Results from the final dispersion analysis would focus on the concentrations at the selected receptors for comparison to the National Ambient Background Concentrations (NAAQS). The following agencies were represented at the meeting:

- U.S. Environmental Protection Agency (USEPA)
- Ohio Environmental Protection Agency (OEPA)
- Columbus Regional Airport Authority (CRAA)
- FAA Detroit Airports District Office
- FAA consultants, Landrum & Brown

The contact information for each of the participants is attached following the minutes of the meeting as **Attachment A**. A computer spreadsheet summarizing the results of preliminary dispersion modeling, and including the FAA's recommendations for worst-case receptor, community receptors, and the worst-case meteorological years were distributed to the meeting participants in advance of the meeting and are attached to this document as **Attachment B**. Also included in Attachment B are the two exhibits showing the location of the modeling receptors around the airport fence line, in the surrounding communities, and also in the terminal core.

**Summary Notes from the August 8, 2007 Teleconference:**

The meeting began at 10:00 a.m. Eastern Daylight Time, and was opened by Ms. Virginia Raps, the Air Quality Manager for Landrum & Brown, the FAA consultant.

Methodology

Ms. Raps provided an overview of the methodology used to conduct dispersion modeling for this discussion. The purpose of the modeling was to identify the receptors at the airport that would result in the highest concentrations of the criteria pollutants, nitrogen oxides ($NO_x$), carbon monoxide (CO), sulfur oxides (SOx), and particulate matter ($PM_{10}$ and $PM_{2.5}$). The analysis was conducted using the FAA Emissions and Dispersion Modeling System (EDMS) Version 4.5.

Ms. Raps explained that two analyses were conducted – the first for the entire set of 145 receptors with the application of all five years of weather data, 2001-2005, and the second focusing just on the higher receptors and possible selections for the community receptors, also with the application of all five years of weather data. The FAA selected a total of five receptor locations, as discussed during a teleconference conducted last October 2, 2006 with the USEPA and OEPA, and summarized in the FAA letter dated October 17, 2006, which is attached in Appendix B.

The results of the first analysis were discussed with the FAA and CRAA in a conference call on July 24, 2007. At that time the receptors with the higher concentrations were determined to be along the arrival and departure curbs and along International Gateway Avenue. In particular, the concentrations were highest along the arrival and departure curb areas. Possible locations for the four community receptor locations were selected north, south, northeast, and southwest of airport property.

The input data for the first EDMS dispersion scenario was modified to reflect updated traffic data, to include additional receptors in the parking garage and curb areas, and to allow relocation of the receptors along International Gateway to capture the highest possible concentrations based on the previous analysis.

The dispersion analysis was repeated using the updated scenario and included 45 receptor locations with the application of all five years of weather data. The results were extracted from the EDMS program through the concentration view screen and summarized in tables in a computer spreadsheet workbook. An image of the view screen was provided showing the $PM_{2.5}$ 24-hour concentration results.

Procedure

Ms. Raps reviewed the procedures outlined in the spreadsheet, which was provided to all participants. First, the "controlling" averaging period for each pollutant for determining the worst-case weather year would be the shortest NAAQS averaging period for the pollutant. For instance, the year resulting in the highest one-hour concentration of CO





would also be used for the eight-hour CO concentration. The analysis showed the highest concentrations occurred in the following years:

| POLLUTANT | CONTROLLING AVERAGING PERIOD | WORST-CASE YEAR |
|---|---|---|
| CO | 1-Hour | 2001 |
| $NO_x$ | Annual | 2003 |
| $SO_x$ | 24-Hour | 2005 |
| $PM_{10}$ | 24-Hour | 2002 |
| $PM_{2.5}$ | 24-Hour | 2002 |

The analysis showed the highest concentration in the terminal area would occur at the arrival curb. The analysis provided concentrations for two community receptors to the north of the airport, two to the south, two to the northeast, and two to the west, which were identified in discussions following the first analysis. The results of the second analysis showed the community receptors with the most consistent highest concentration were as follows:

| RECEPTOR | DIRECTION | LOCATION |
|---|---|---|
| 120 | North | Gahanna, near Xavier Street |
| 60 | Northeast | Morrison Road and Waterbury Blvd. intersection |
| 123 | South | Whitehall |
| 118 | Southwest | Mifflin |

The results of the analysis were given on the "Summary" tab in the spreadsheet.

Individual Pollutant Results

Ms. Raps reviewed the summary of results, by pollutant type, given on each of the five EXCEL spreadsheets for $NO_x$, $PM_{2.5}$, CO, $PM_{10}$, and $SO_x$. It was noted that the highest concentrations calculated by EDMS for each pollutant would be lower than the NAAQS even when given the addition of the background concentration, except for $PM_{2.5}$. The background concentration of $PM_{2.5}$ in Franklin County exceeds the $PM_{2.5}$ NAAQS and concentrations would exceed regardless of any contribution from the airport.

Comments

Ms. Sarah Hedlund, OEPA, expressed concern about the number of receptors rather than the specific location. While Ms. Hedlund agreed that the location of the community receptors would satisfy the public awareness concerns of the FAA for the purpose of the EIS, the OEPA believes there should be a greater number of receptors, particularly at the southern fence line because that would be the location of the proposed replacement runway. Discussion among the participants indicated that based on the results of the dispersion analysis it is unlikely that pollutant concentrations at the fence line would exceed the NAAQS; however, Ms. Hedlund said that fence-line analysis would disclose the impact of the project and OEPA would be interested in reviewing the data. Ms. Katy

Jones, FAA, and Ms. Raps explained that the dispersion analysis for the draft EIS would be limited to five receptors, as agreed during the October 2006 coordination conference call. However, Ms. Jones and Mr. Rob Adams, L&B, asked that OEPA submit a written comment explaining both the need for additional receptors and their suggested locations, and the FAA will take the suggestion under advisement.

Ms. Sherry Kamke, USEPA, asked what the airport might be doing to reduce $PM_{2.5}$ emissions in light of the already high values of the pollutant in the background ambient air. Ms. Raps explained that the relocation and consolidation of the rental car facility (RAC) to an area northwest of the I-270 interchange would likely reduce the concentration of $PM_{2.5}$ emissions, and other emissions as well. The relocation of the RAC operations away from the terminal core would occur regardless of the project proposed for the CMH EIS. Mr. Dave Wall, CRAA, confirmed that the USEPA had already suggested the use of clean-running buses for the RAC to replace the diesel-powered buses being used under current conditions. Mr. Wall will discuss this strategy with the planners at CRAA.

Next Steps

Comments or requests relating to this scoping teleconference should be provided ***in writing to the FAA no later than Friday, August 10, 2007***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174

**Email:** CMHEIS@FAA.GOV

**Website:** www.Airportsites.net/CMH-EIS





**ATTACHMENT A**

**MEETING PARTICIPANTS**

The following is a list of the meeting participants, which attended either in person or by teleconference.

| | |
|---|---|
| **Name:** | Ms. Sam MacDonald |
| **Title:** | Environmental Specialist 2 |
| **Agency/Division/Firm** | Ohio EPA/Division of Air Pollution Control |
| **Mailing Address** | 50 W. Town St.<br>Columbus, OH 43215 |
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| **FAX Number:** | 614-644-3681 |
| **Name:** | Ms. Sarah Hedlund |
| **Title:** | Air Quality Modeler |
| **Agency/Division/Firm** | OEPA |
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| **E-mail Address:** | sarah.hedlund@epa.state.oh.us |
| **Telephone Number:** | 614-644-3632 |
| **FAX Number:** | 614-644-3681 |
| **Name:** | Mr. David Wall, A.A.E. |
| **Title:** | Capital Program Manager |
| **Agency/Division/Firm** | Columbus Regional Airport Authority (CRAA) |
| **Mailing Address** | 4600 International Gateway<br>Columbus, OH 43219 |
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| **Telephone Number:** | 614-239-4063 |
| **FAX Number:** | 614-238-7850 |

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|---|---|
| **Name:** | Ms. Patricia Morris |
| **Title:** | Environmental Scientist |
| **Agency/Division/Firm** | USEPA Region 5 |
| **Mailing Address** | 77 W. Jackson Blvd. |
| | Chicago, IL 60604 |
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| | |
|---|---|
| **Name:** | Sherry A. Kamke |
| **Title:** | Environmental Scientist, NEPA Implementation Section<br>Office of Science, Ecosystems, and Communities |
| **Agency/Division/Firm** | USEPA Region 5 Mailcode B-19J |
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|---|---|
| **Name:** | Mary Portanova |
| **Title:** | Environmental Engineer |
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|---|---|
| **Name:** | Ms. Katherine Jones |
| **Title:** | Project Manager |
| **Agency/Division/Firm** | FAA, Detroit Airports District Office |
| **Mailing Address** | 11677 South Wayne road, Suite 107 |
| | Romulus, MI 48174 |
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| **FAX Number:** | (734) 229-2950 |

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|---|---|
| **Name:** | Mr. Rob Adams |
| **Title:** | Managing Director, Project Manager CMH EIS |
| **Agency/Division/Firm** | Landrum & Brown |
| **Mailing Address** | 11279 Cornell Park Drive |
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|---|---|
| **Name:** | Ms. Virginia L. Raps |
| **Title:** | Air Quality Manager – CMH EIS |
| **Agency/Division/Firm** | Landrum & Brown |
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| **Telephone Number:** | 513-530-1238 |
| **FAX Number:** | 513-530-2238 |

## ATTACHMENT B

## ELECTRONIC FILES

The following electronic files are attached:

- "Comparison for Worst Case 080607" Microsoft EXCEL file
- Exhibit 6, Airport and Community Dispersion Receptor Locations
- Exhibit 7, Terminal Area Dispersion Receptor Locations
- FAA October 17, 2006 letter to USEPA in response to comments relating to the Air Quality Scoping Meeting, July 19, 2006

## COMPARATIVE DISPERSION RESULTS
## FOR THE WORST-CASE RECEPTOR AND REPRESENTATIVE COMMUNITY RECEPTORS

August 6, 2007

NOTE: The data presented in this workbook should not be used for evaluation of compliance to the NAAQS. The study is still being evaluated for correct input.

Two dispersion analyses of 2006 Existing Conditions for the CMH EIS were run using EDMS, Version 4.5.

The first version of the 2006 Existing Conditions run was dated July 14, 2007 (the 071407 sensitivity run), and included all years (5 years) and all receptors (145 receptors).

The 071407sensitivity run showed the highest concentrations would all occur in the "terminal core," at the arrival and departure curbs, the parking garage adjacent to the terminal building, and along International Gateway.

The results of the 071407 run were coordinated with FAA and CRAA and were used to determine the location of the worst-case receptor, and to determine the most representative locations for sensitive community receptors.

Based on the 071407 run, the locations of the terminal area receptors were revised to more accurately capture the concentrations at the terminal curbs and the garage, as well as Int'l Gateway.
Five additional receptors were assigned to the curb area and garage. The location of the receptors is shown in the two attachments, Exhibit 6 and Exhibit 7.
The arrival and departure curb receptors are in the same geographical location, however, the departure curb is modeled as an elevated source to reflect the 2nd level of the structure.
The two short term garage receptors are in the same location, however both are elevated to reflect their 4th and 5th floor location in the parking garage.
The four long term garage receptors are in the same location, however all are elevated to reflect the 3rd through 6th floor location of the receptors.
The two RAC garage receptors are in the same location, however the 2nd floor parking areal is elevated.
In addition, updated information was provided by CRAA that increased the traffic count on all the terminal-area roadways. The 080607 run reflects these updates.

Dispersion analysis was repeated with a reduced set of receptors (45) limited to all the receptors in the terminal core (2 at the arrival/departure curbs, 8 in the garages, 27 along International Gateway), and included all the possible community receptors suggested by the FAA and CRAA (8 receptors).
This was the run dated August 6, 2007 (the 080607 run).
Results of the 080607 runs are presented in this workbook.

The results of the 080607 run were extracted from the *.CON files generated by AERMOD using the model's view screen for sorting the data.
An example of one of the view screen images is given below:

EDMS 4.5 : [CMH_06EX_080607] - [Concentrations : C  Wxpcvgedms5

File Emissions Airport Dispersion View Utilities Window Help

File Name CMH_02_PM25_A24_080607.CON Averaging Period 24-HR Group ALL Query

| Receptor Name | X (m) | Y (m) | Concentration (µg/m³) | Elevation (m) | Hill (m) | Height (m) | Averaging Period | Source Group | Date/Time |
|---|---|---|---|---|---|---|---|---|---|
| Arr Curb | 618.74402 | 18.84578 | 7.46228 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/10/2002 |
| Dep Curb | 618.74402 | 18.84578 | 5.59169 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 10/10/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 5.59142 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/10/2002 |
| Arr Curb | 618.74402 | 18.84578 | 5.33495 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 09/26/2002 |
| Arr Curb | 618.74402 | 18.84578 | 5.17108 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 11/05/2002 |
| Arr Curb | 618.74402 | 18.84578 | 5.06499 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 01/01/2002 |
| Arr Curb | 618.74402 | 18.84578 | 4.85162 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/08/2002 |
| Arr Curb | 618.74402 | 18.84578 | 4.81974 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 06/19/2002 |
| Arr Curb | 618.74402 | 18.84578 | 4.71373 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/25/2002 |
| Arr Curb | 618.74402 | 18.84578 | 4.70289 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/21/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 4.63481 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 01/01/2002 |
| RAC Lvl 2 | 509.01599 | 49.84699 | 4.48163 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 10/10/2002 |
| Dep Curb | 618.74402 | 18.84578 | 4.38288 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 09/26/2002 |
| Dep Curb | 618.74402 | 18.84578 | 4.37827 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 01/01/2002 |
| Arr Curb | 618.74402 | 18.84578 | 4.36152 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 07/25/2002 |
| Dep Curb | 618.74402 | 18.84578 | 4.32193 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 11/05/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 4.26713 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/21/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 4.23872 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 11/05/2002 |
| T12 | -35.58133 | 13.63368 | 4.11759 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/10/2002 |
| LT Lvl 3 | 508.92456 | 4.84632 | 4.11599 | 248.41 | 248.41 | 9.14 | 24-HR | ALL | 01/01/2002 |
| Arr Curb | 618.74402 | 18.84578 | 4.10176 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 12/29/2002 |
| T13 | 122.81611 | -0.36576 | 4.07668 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/10/2002 |
| T11 | -179.98135 | 23.63366 | 3.99032 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/10/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 3.98235 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 07/25/2002 |
| RAC Lvl 2 | 509.01599 | 49.84699 | 3.90650 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 01/01/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.86992 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/04/2002 |
| Dep Curb | 618.74402 | 18.84578 | 3.85817 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 10/25/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.85747 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 09/30/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 3.85705 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/08/2002 |
| Dep Curb | 618.74402 | 18.84578 | 3.85654 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 06/19/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.85277 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 05/08/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 3.84489 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 09/26/2002 |
| Dep Curb | 618.74402 | 18.84578 | 3.78946 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 10/08/2002 |

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|---|---|---|---|---|---|---|---|---|---|
| Dep Curb | 618.74402 | 18.84578 | 3.78946 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 10/08/2002 |
| RAC Lvl 2 | 509.01599 | 49.84699 | 3.75294 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 11/05/2002 |
| T10 | -321.38391 | 34.63312 | 3.65741 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/10/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.62912 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 01/06/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.62610 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 09/25/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.60336 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 09/08/2002 |
| Dep Curb | 618.74402 | 18.84578 | 3.59778 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 10/21/2002 |
| T9 | -480.78262 | 43.63387 | 3.59089 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/10/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.58643 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 06/03/2002 |
| RAC Lvl 1 | 509.01599 | 49.84699 | 3.57397 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 06/19/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.55298 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 04/27/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.52469 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 04/11/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.50704 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 12/04/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.46580 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 10/11/2002 |
| T13 | 122.81611 | -0.36576 | 3.45207 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 09/26/2002 |
| RAC Lvl 2 | 509.01599 | 49.84699 | 3.44650 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 09/26/2002 |
| RAC Lvl 2 | 509.01599 | 49.84699 | 3.43267 | 248.41 | 248.41 | 5.49 | 24-HR | ALL | 10/21/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.43176 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 04/24/2002 |
| T13 | 122.81611 | -0.36576 | 3.42860 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 06/19/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.41559 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 06/07/2002 |
| Arr Curb | 618.74402 | 18.84578 | 3.39487 | 248.41 | 248.41 | 1.83 | 24-HR | ALL | 12/24/2002 |

***Procedure:***

1. Based on USEPA guidelines, the shortest NAAQS averaging period applicable to each pollutant was evaluated to determine the worst-case year:

| | |
|---|---|
| CO | 1-hr |
| NOx | Annual |
| SOx | 24-hr |
| PM10 | 24-hr |
| PM2.5 | 24-hr |

2. Sensitivity analyses showed the maximum concentrations would be along the arrival curb, departure curb, parking garage adjacent to the terminal, and along International Gateway Drive, near the turn-around just west of the parking garage (bowtie).

3. For each of the pollutants and averaging periods listed in #1, the five receptors with the highest concentrations were extracted from the AERMOD *.CON files. The maximum concentration occurred most consistently at the receptor located at the arrival curb. The year of the maximum concentration at the arrival curb was chosen as the worst-case year for that pollutant, and will be used for all applicable averaging periods for that pollutant.

4. The results of modeling showed the maximum concentration at the arrival curb occurred as follows:

| POLLUTANT | AVG. PERIOD | YEAR |
|---|---|---|
| CO | 1-hr | 2001 |
| NOx | annual | 2003 |
| SOx | 24-hr | 2005 |
| PM10 | 24-hr | 2002 |
| PM2.5 | 24-hr | 2002 |

5. In addition to the receptor located at the arrival curb, four community receptors are recommended by FAA and CRAA:

**North** of the airport, Receptor 13 or Receptor 120, whichever is higher in the worst-case year, Gahanna,
**Northeast** of the airport, Receptor 60 or Receptor 96, whichever is higher in the worst-case year, near the interchange of I-270 and Rt. 317, and near the Morrison Road and Waterbury Blvd. intersection,
**South** of the airport, Receptor 103 or Receptor 123, whichever is higher in the worst-case year, Whitehall
**Southwest** of the airport, Receptor 118 in Mifflin, in the worst-case year, near Krum Park

6. Results of dispersion analysis for the community receptors for the worst-case year for each pollutant given in #1 above show the maximum concentrations occurred most often for the following community receptors:

Receptor 120, Gahanna, near Xavier Street
Receptor 60, near the interchange of I-270 and Rt. 317, and the Morrison Road and Waterbury Blvd intersection
Receptor 123, Whitehall, near the intersection of Poth Road and N. Yearling Road

7. The final set of recommended receptors:

Arrival curb
Receptor 120, Gahanna
Receptor 60, I-270 and Rt. 317
Receptor 123, Whitehall
Receptor 118, Mifflin

**Reference:**

Use of Meteorological Data in Air Quality Trend Analysis
Authors: M.D. Zeldin and W.S. Meisel
USEPA, EPA-450/3-78-024
May 1978
USEPA Project Manager Neil H. Frank
Office of Air Quality Planning and Standards

No updated version of this document or more recent publication with related information was located.

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Reference Implications:

"Variations in pollutant concentrations, especially on a daily basis, are primarily due to meteorology." Indicates that annual averaging periods may not be sensitive enough to show variations caused by meteorology alone." Implies that the 1-hour, 8-hour, and 24-hour averages should be sensitive to weather changes.

"Except in the case of specific point sources, where daily changes in emissions can affect air quality in a substantial manner, the general uniformity in daily emissions over most urban areas dictates that short-term changes of measured concentrations are caused by meteorological fluctuations." Short-Term is defined in USEPA ISC3 User's Guide (p. 3-9, EPA-454/B-95-003a) as a 24-hour average or less.

"The longer the period of analysis (i.e. averaging period), the greater the potential for pollutant variances to be complicated by both meteorological and emission factors." Implies the shortest averaging period possible should be used.

"Variation in annual 1-hour maximum concentrations reflects the variability in annual "worst-case" meteorology. . . . the level of an average concentration is a more stable parameter." None of the NAAQS specifies maximum concentrations, but rather average concentrations over a specified period of time. Enforces the consideration of the shortest possible averaging period to obtain the worst-case results.

**Maximum Terminal-Area Receptors**

| NOx | PM2.5 | CO | PM10 | SOx |
|---|---|---|---|---|
| Highest is 2003 | Highest is 2002 | Highest is 2001 | Highest is 2002 | Highest is 2005 |
| 48.40 Arr Curb | 7.46 Arr Curb | 12,738 Arr Curb | 8.04 Arr Curb | 46.16 Arr Curb |
| 41.19 RAC LVL1 | 5.59 Dep Curb | 10,825 RAC LVL1 | 6.05 RAC LVL1 | 36.16 Dep Curb |
| 38.15 Dep Curb | 5.59 RAC LVL1 | | 6.01 Dep Curb | 20.38 RAC LVL1 |
| 35.26 RAC LVL2 | 4.48 RAC LVL2 | | | 18.89 Short Term LVL4 |
| 31.90 T13 | | | | |

**Community Receptors - Maximum Concentration**

| Pollutants and Maximum Receptors | | | | | Most Representative Receptor |
|---|---|---|---|---|---|
| **NOx** | **PM2.5** | **CO** | **PM10** | **SOx** | |
| 13 | 120 | 13 | 120 | 120 | 120 |
| 60 | 60 | 60 | 60 | 60 | 60 |
| 123 | 123 | 123 | 123 | 123 | 123 |
| 118 | 118 | 119 | 118 | 119 | 118 |

**NOX**
**HIGHEST CONCENTRATIONS BY YEAR,BY AVERAGING PERIOD, BY RECEPTOR**

**ANNUAL AVERAGE**
**USEPA STANDARD 100 mg/m³**
**Worst-Case Receptor and Weather Year**

61 ug/m3 causes Exceedance

| 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | Highest is 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| Arr Curb | 46.031 | Arr Curb | 45.264 | Arr Curb | 48.403 | Arr Curb | 43.367 | Arr Curb | 45.412 | 48.4 Arr Curb |
| RAC LVL1 | 39.861 | RAC LVL1 | 39.355 | RAC LVL1 | 41.186 | RAC LVL1 | 37.060 | RAC LVL1 | 39.247 | 41.2 RAC LVL1 |
| Dep Curb | 35.944 | Dep Curb | 35.755 | Dep Curb | 38.151 | Dep Curb | 34.574 | Dep Curb | 36.112 | 38.2 Dep Curb |
| RAC LVL2 | 33.863 | RAC LVL2 | 33.722 | RAC LVL2 | 35.262 | RAC LVL2 | 32.039 | RAC LVL2 | 33.700 | 35.3 RAC LVL2 |
| T13 | 31.027 | T13 | 29.737 | T13 | 31.895 | T13 | 29.075 | T13 | 30.821 | 31.9 T13 |

**Proposed Representative Community Receptors**

| EXHIBIT 6 RECEPTORS | 2003 |
|---|---|
| | |
| 13 | 4.07 |
| 120_G1 | 3.95 |
| | |
| 60 | 1.68 |
| 96 | 1.16 |
| | |
| 103 | 1.14 |
| 123_W1 | 1.74 |
| | |
| 119_MF-1 | 2.69 |
| 118_MF-2 | 2.96 |

| | | |
|---|---|---|
| North | AR | 13 Airport Receptor (fenceline) |
| | G1 | 120 Gahanna, near Goshen Lane and Denison Avenue |
| East | AR | 60 Airport Receptor (middle fenceline ring) |
| | AR | 96 Airport Receptor (outer fenceline ring) |
| South | AR | 103 Airport Receptor (outer fenceline ring) |
| | W1 | 123 Whitehall, near Yearling Rd. |
| West | MF-1 | 119 Mifflin near Drake Rd. |
| | MF-2 | 118 Mifflin, near Krum Park |

PM 2.5

**HIGHEST CONCENTRATIONS BY YEAR,BY AVERAGING PERIOD, BY RECEPTOR**

**24-HR AVERAGE**
**USEPA STANDARD 35 μg/m³**
**Worst-Case Receptor and Weather Year**

-17.1 ug/m3 causes Exceedance

| 2001 | | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|---|
| Arr Curb | 6.274 | Arr Curb | 7.462 | Arr Curb | 6.842 | Arr Curb | 4.854 | Arr Curb | 5.663 |
| RAC LVL1 | 5.037 | Dep Curb | 5.592 | RAC LVL1 | 5.567 | RAC LVL1 | 4.477 | Dep Curb | 4.940 |
| Dep Curb | 4.820 | RAC LVL1 | 5.591 | Dep Curb | 4.845 | Dep Curb | 4.013 | RAC LVL1 | 4.129 |
| RAC LVL2 | 4.286 | RAC LVL2 | 4.482 | RAC LVL2 | 4.261 | RAC LVL2 | 3.856 | RAC LVL2 | 3.687 |
| T27 | 4.020 | T12 | 4.118 | T13 | 3.692 | T13 | 3.242 | Long Term LVL3 | 3.529 |

**Highest is 2002**
**7.462 Arr Curb**
**5.592 Dep Curb**
**5.591 RAC LVL1**
**4.482 RAC LVL2**

**Proposed Representative Community Receptors**

| EXHIBIT 6 RECEPTORS | 2002 |
|---|---|
| 13 | 1.226 |
| 120_G1 | 2.023 |
| 60 | 1.701 |
| 96 | 1.256 |
| 103 | 0.713 |
| 123_W1 | 1.208 |
| 119_MF-1 | 0.873 |
| 118_MF-2 | 2.031 |

| | | |
|---|---|---|
| North | AR | 13 Airport Receptor (fenceline) |
| | G1 | 120 Gahanna, near Goshen Lane and Denison Avenue |
| East | AR | 60 Airport Receptor (middle fenceline ring) |
| | AR | 96 Airport Receptor (outer fenceline ring) |
| South | AR | 103 Airport Receptor (outer fenceline ring) |
| | W1 | 123 Whitehall, near Yearling Rd. |
| West | MF-1 | 119 Mifflin near Drake Rd. |
| | MF-2 | 118 Mifflin, near Krum Park |

CARBON MONOXIDE

**HIGHEST CONCENTRATIONS BY YEAR,BY AVERAGING PERIOD, BY RECEPTOR**

**1-HR AVERAGE**
**USEPA STANDARD 40,000 μg/m³**
**Worst-Case Receptor and Weather Year**

35,204 ug/m3 causes Exceedance

| 2001 | | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|---|
| Arr Curb | 12,738 | Arr Curb | 10,712 | Arr Curb | 12,176 | RAC LVL1 | 8,489.2 | Arr Curb | 11237.7 |
| RAC LVL1 | 10,825 | RAC LVL1 | 8,847 | T24 | 10,029 | Arr Curb | 8,105.3 | RAC LVL1 | 9046.3 |
| T22 | 9,285 | T18 | 7,400 | T23 | 9,902 | T17 | 7,388.1 | T16 | 7519.9 |
| T23 | 9,151 | T13 | 7,239 | T12 | 9,647 | T16 | 7,378.1 | T7 | 7297.5 |
| Dep Curb | 9,021 | T10 | 7,097 | RAC LVL1 | 9,621 | T13 | 7,282.5 | T17 | 7196.9 |

**Highest is 2001**
**12,738 Arr Curb**
**10,825 RAC LVL1**

**Proposed Representative Community Receptors**

| EXHIBIT 6 RECEPTORS | 2001 |
|---|---|
| 13 | 4,551 |
| 120_G1 | 4,531 |
| 60 | 5,256 |
| 96 | 4,536 |
| 103 | 1,840 |
| 123_W1 | 3,666 |
| 119_MF-1 | 3,538 |
| 118_MF-2 | 2,430 |

| | | |
|---|---|---|
| North | AR | 13 Airport Receptor (fenceline) |
| | G1 | 120 Gahanna, near Goshen Lane and Denison Avenue |
| East | AR | 60 Airport Receptor (middle fenceline ring) |
| | AR | 96 Airport Receptor (outer fenceline ring) |
| South | AR | 103 Airport Receptor (outer fenceline ring) |
| | W1 | 123 Whitehall, near Yearling Rd. |
| West | MF-1 | 119 Mifflin near Drake Rd. |
| | MF-2 | 118 Mifflin, near Krum Park |

PM 10
**HIGHEST CONCENTRATIONS BY YEAR,BY AVERAGING PERIOD, BY RECEPTOR**

**24-HR AVERAGE**
**USEPA STANDARD 150 µg/m³**
**Worst-Case Receptor and Weather Year**

65 ug/m3 causes Exceedance

| 2001 | | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|---|
| Arr Curb | 6.561 | Arr Curb | 8.036 | Arr Curb | 7.299 | Arr Curb | 5.154 | Arr Curb | 6.380 |
| RAC LVL1 | 5.373 | RAC LVL1 | 6.046 | RAC LVL1 | 6.031 | RAC LVL1 | 4.773 | Dep Curb | 5.491 |
| Dep Curb | 5.026 | Dep Curb | 6.011 | Dep Curb | 5.163 | Dep Curb | 4.280 | RAC LVL1 | 4.452 |
| RAC LVL2 | 4.569 | Lng Term LVL3 | 5.094 | T13 | 4.307 | RAC LVL2 | 4.111 | RAC LVL2 | 4.082 |
| T27 | 4.541 | RAC LVL2 | 4.937 | T27 | 4.172 | T13 | 3.607 | Long Term LVL3 | 3.869 |

**Highest is 2002**
**8.036 Arr Curb**
**6.046 RAC LVL1**
**6.011 Dep Curb**

**Proposed Representative Community Receptors**

| EXHIBIT 6 RECEPTORS | 2002 |
|---|---|
| | |
| 13 | 1.30 |
| 120_G1 | 2.13 |
| | |
| 60 | 1.81 |
| 96 | 1.34 |
| | |
| 103 | 0.75 |
| 123_W1 | 1.25 |
| | |
| 119_MF-1 | 0.96 |
| 118_MF-2 | 2.21 |

| | | |
|---|---|---|
| North | AR | 13 Airport Receptor (fenceline) |
| | G1 | 120 Gahanna, near Goshen Lane and Denison Avenue |
| East | AR | 60 Airport Receptor (middle fenceline ring) |
| | AR | 96 Airport Receptor (outer fenceline ring) |
| South | AR | 103 Airport Receptor (outer fenceline ring) |
| | W1 | 123 Whitehall, near Yearling Rd. |
| West | MF-1 | 119 Mifflin near Drake Rd. |
| | MF-2 | 118 Mifflin, near Krum Park |

SULFUR OXIDES
**HIGHEST CONCENTRATIONS BY YEAR,BY AVERAGING PERIOD, BY RECEPTOR**

**24-HR AVERAGE**
**USEPA STANDARD 365 µg/m³**
**Worst-Case Receptor and Weather Year**

291.64 ug/m3 causes Exceedance

| 2001 | | 2002 | | 2003 | | 2004 | | 2005 | |
|---|---|---|---|---|---|---|---|---|---|
| Arr Curb | 32.201 | Arr Curb | 41.971 | Arr Curb | 43.747 | Arr Curb | 30.319 | Arr Curb | 46.158 |
| Dep Curb | 23.677 | Dep Curb | 31.358 | Dep Curb | 33.065 | Dep curb | 23.284 | Dep Curb | 36.158 |
| RAC LVL2 | 15.289 | RAC LVL 1 | 20.313 | RAC LVL1 | 18.989 | RAC LVL1 | 14.349 | RAC LVL1 | 20.380 |
| RAC LVL1 | 15.279 | Short Term LVL4 | 17.176 | RAC LVL2 | 18.103 | Short Term LVL4 | 13.663 | RAC LVL2 | 19.680 |
| Short Term LVL4 | 14.295 | Long Term LVL3 | 15.328 | Short Term LVL4 | 16.790 | RAC LVL2 | 12.823 | Short Term LVL4 | 18.891 |

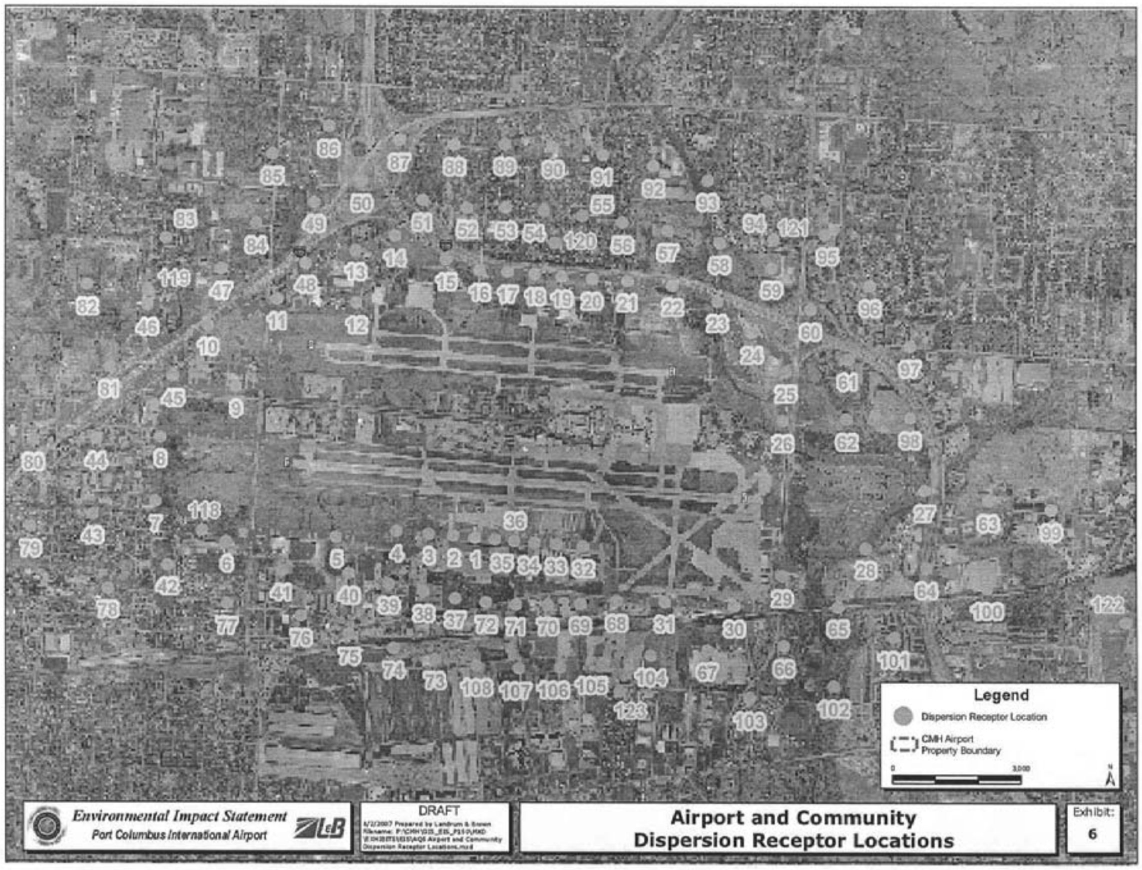
**Highest is 2005**
**46.158 Arr Curb**
**36.158 Dep Curb**
**20.380 RAC LVL1**

**18.891 Short Term LVL4**

**Proposed Representative Community Receptors**

| EXHIBIT 6 RECEPTORS | 2005 |
|---|---|
| | |
| 13 | 3.86 |
| 120_G1 | 5.70 |
| | |
| 60 | 3.45 |
| 96 | 2.13 |
| | |
| 103 | 2.88 |
| 123_W1 | 5.04 |
| | |
| 119_MF-1 | 2.66 |
| 118_MF-2 | 2.44 |

| | | |
|---|---|---|
| North | AR | 13 Airport Receptor (fenceline) |
| | G1 | 120 Gahanna, near Goshen Lane and Denison Avenue |
| East | AR | 60 Airport Receptor (middle fenceline ring) |
| | AR | 96 Airport Receptor (outer fenceline ring) |
| South | AR | 103 Airport Receptor (outer fenceline ring) |
| | W1 | 123 Whitehall, near Yearling Rd. |
| West | MF-1 | 119 Mifflin near Drake Rd. |
| | MF-2 | 118 Mifflin, near Krum Park |


Legend
Dispersion Receptor Location
CMH Airport Property Boundary
Environmental Impact Statement
Port Columbus International Airport
DRAFT
Airport and Community
Dispersion Receptor Locations
Exhibit:
6


10L
10R
T1
T2
T3
T4
T5
T6
T7
T8
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T18
T19
T20
T21
RAC GARAGE
SHORT TERM GARAGE
LONG TERM GARAGE
ARRIVAL/ DEPARTURE CURB
Environmental Impact Statement
Port Columbus International Airport
DRAFT
Terminal Area Dispersion Receptor Locations
Exhibit:
7

## *Federal Aviation Administration*

### ENVIRONMENTAL IMPACT STATEMENT

FOR

### REPLACEMENT RUNWAY AND TERMINAL EXPANSION

AT

### PORT COLUMBUS INTERNATIONAL AIRPORT

### AIR QUALITY SCOPING TELECONFERENCE SUMMARY

**TELECONFERENCE CONDUCTED**

**AUGUST 10, 2007**

**1:00 P.M. – 2:45 P.M.**

A web-based teleconference was convened on the afternoon of Friday, August 10, 2007, to further discuss the selection of receptor locations for the dispersion analysis that will be included in the Port Columbus International Airport Environmental Impact Statement (CMH EIS). The following agencies and firms were represented at the meeting:

- Ohio Environmental Protection Agency (OEPA)
- Federal Aviation Administration (FAA) Detroit Airports District Office
- FAA consultants, Landrum & Brown (L&B)

The contact information for each of the participants is attached following the minutes of the meeting as **Attachment A**. The computer spreadsheet summarizing the results of preliminary dispersion modeling, including the FAA's recommendations for worst-case receptor, community receptors, and the worst-case meteorological years, were distributed to the participants at the meeting conducted the previous Wednesday and were also referenced during today's call. These documents are attached to as **Attachment B**. Also included in Attachment B are the two exhibits showing the location of the modeling receptors around the airport fence line and within the terminal core. In addition, graphs of a wind analysis prepared using historic weather data recorded at CMH, which was referenced during the discussion, is included in Attachment B.





**Summary Notes from the August 10, 2007 Teleconference:**

The meeting began at 1:00 p.m. Eastern Daylight Time, and was opened by Ms. Katherine Jones, FAA project manager for the CHM EIS. Ms. Jones explained that subsequent to OEPA's concerns discussed at the last teleconference on Wednesday, August 8, 2007, the FAA and the FAA's consultant, L&B, had discussed in more detail the selection of receptor locations necessary to fully report the impacts of the CMH EIS proposed project on air quality. FAA believes further discussion is warranted because OEPA expressed a need to see dispersion results for more receptor locations than the five presented for comment during Wednesday's teleconference. During Wednesday's call, OEPA expressed interest in results at fence line receptors, particularly near the location where the replacement runway is proposed, south of existing Runway 10R/28L. Receptors 1-5 and receptors 29-36 are located along the fence line south of Runway 10R/28L. While OEPA concurred that the receptor located at the airport arrival curb would reflect the worst-case concentration of all five pollutants and averaging periods, and agreed that the four community-located receptors would satisfy the public's need to know the impact of the proposed project on surrounding neighborhoods, OEPA expressed the opinion that additional results should be reviewed by OEPA before a recommendation could be made for the selection of receptors that would be considered for analysis in the Draft EIS.

Representatives from the USEPA were contacted for participation in this conference call but were unable to attend. Ms. Jones will update Ms. Sherry Kamke and Patricia Morris, USEPA Region 5, on Monday morning, August 13, 2007. Likewise, OEPA's air quality manager, Mr. Bill Spires, was unable to attend and will be contacted on Monday morning by Ms. Jones to review issues discussed throughout this conference call to determine whether a face-to-face meeting would be advisable next week.

<u>Prevailing Winds</u>

Prior to this meeting, L&B's air quality manager, Ms. Virginia Raps, reviewed results of the preliminary base-case dispersion analysis to determine the location of receptors that are impacted by emissions from aircraft operating on the south runway. These were identified as receptors located to the northeast and east of Runway 28R and Runway 28L. Ms. Raps explained that the impacted receptors were to the northeast of the runway ends because of the affect of prevailing winds at Columbus. Ms. Raps presented a diagram of prevailing winds reflecting 30 years of historical weather data plotted on a radar graph. Prevailing winds at Columbus are from the southwest through the west. Therefore, it would be expected that the receptors most impacted by aircraft operating on the proposed replacement runway, and in particular aircraft queuing up and taking off from Runway 28L, would be those receptors located east of the airport. For example, receptors 26, 62, 63, 98, and 27 (refer to Exhibit 6) were found to be the location of the highest concentration of $PM_{2.5}$ emissions from aircraft on the airport. The highest concentration of CO from aircraft would occur northeast of the airport at receptors 22 and 57; and $NO_x$ impacts were pronounced at receptors 20 and 21. The $NO_x$ results are caused by aircraft queuing on Runway End 28R and taxiing beside the runway. Along the south fence line, although concentrations were much lower in this area, concentrations were highest for receptors 32, 33, 34, 3, 4, & 5, most likely due to the close proximity of the receptors to the runway during period of stagnant air and calm winds (0-5 knots). Consequently, Ms. Raps suggested that if additional receptors were analyzed to more fully reflect impacts due to aircraft operations on the south runway, perhaps information from receptors located in these two areas would be more meaningful. All results for the additional receptors were less than concentrations in the terminal core.

OEPA Requests

Ms. Sarah Hedlund and Ms. Sam MacDonald, OEPA, expressed their concern that OEPA could not make a recommendation until results of a larger group of receptors has been reviewed. By not providing this additional information, FAA is perceived to be excluding OEPA's participation in this coordination effort. Ms. Hedlund and Ms. MacDonald requested that the AERMOD files associated with the dispersion analysis be provided to OEPA for review and verification before OEPA can make recommendations for receptor selection. Specifically, Mr. Spires previously asked for the *.HRE AERMOD files associated with the report of results presented at the teleconference on Wednesday. These files would be related to the dispersion analysis of all receptors and all pollutants. The OEPA requests "tangible proof" of concentration values associated with each receptor. Ms. Hedlund suggested that a table is typically available through AERMOD output files that show the maximum concentration for every receptor. Ms. Hedlund and Ms. MacDonald stated that what the OEPA is looking for are areas where concentrations "spike" due to the project, particularly along the fence line and in the vicinity of the proposed runway; and receptors that show evidence of higher concentrations from the south runway, whether or not they are located at the fence line.

Ms. Raps showed the participants an AERMOD output file from this project. According to Ms. Hedlund, the file was not in the same format usually produced through AERMOD analysis conducted at OEPA. Ms. Raps suggested that Ms. Hedlund provide an example of such a file so that FAA could understand exactly what OEPA is familiar with. In addition, Ms. Raps suggested that she and Ms. Hedlund conduct a follow-up web-based teleconference to verify the methodology and procedure for creating AERMOD input and output files in FAA's Emissions and Dispersion Modeling System (EDMS). That meeting is tentatively planned for Tuesday, August 21, 2007 at 2:00 P.M. Katy Jones will check with Sherry Kamke and Pat Morris, USEPA Region 5, to solicit their participation in the call, which will also be attended by Ms. Jones.

Extended Comment Period

As a result of this discussion, the comment period for OEPA and USEPA to respond to the FAA recommendation was extended to Friday, August 24, 2007.





Next Steps

Ms. Katy Jones stated that she will need to consult with FAA legal representatives before any proprietary AERMOD files could be supplied to the OEPA. Ms. MacDonald suggested that perhaps a confidentiality agreement could be negotiated that would allow OEPA access to the FAA's files.

Meanwhile, Ms. Hedlund and Ms. Raps will work together to produce an AERMOD table of results showing the highest concentration, per receptor, per pollutant controlling average time, for existing conditions. If this is not possible, Ms. Raps will try to produce the table from results contained in the AERMOD *.CON files. Following receipt of this new information, OEPA would review the data and suggest a number of additional receptors OEPA believes appropriate to reflect impacts from the proposed project. The list should be prioritized with an explanation of why each receptor appears to be relative to an impact assessment. FAA will then discuss the recommendations with OEPA. Ms. Jones suggested the possibility of increasing the total number of receptors to ten based on OEPA's recommendations, which includes the five receptors already selected by FAA.

OEPA's comments relating to dispersion receptor location should be provided ***in writing to the FAA no later than Friday, August 24, 2007***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174

**Email:** CMHEIS@FAA.GOV

**Website:** www.Airportsites.net/CMH-EIS

## ATTACHMENT A

## MEETING PARTICIPANTS

The following is a list of the meeting participants, which attended either in person or by teleconference.

| | |
|---|---|
| **Name:** | Ms. Katherine Jones |
| **Title:** | FAA Project Manager |
| **Agency/Division/Firm** | FAA Detroit Airports District Office |
| **Mailing Address** | 11677 South Wayne Road, Suite 107<br>Romulus, MI 48174 |
| **E-mail Address:** | Katherine.S.Jones@faa.gov |
| **Telephone Number:** | |
| **FAX Number:** | |

| | |
|---|---|
| **Name:** | Ms. Sam MacDonald |
| **Title:** | Environmental Specialist 2 |
| **Agency/Division/Firm** | Ohio EPA/Division of Air Pollution Control |
| **Mailing Address** | 50 W. Town St.<br>Columbus, OH 43215 |
| **E-mail Address:** | sam.macdonald@epa.state.oh.us |
| **Telephone Number:** | 614-728-1743 |
| **FAX Number:** | 614-644-3681 |

| | |
|---|---|
| **Name:** | Ms. Sarah Hedlund |
| **Title:** | Air Quality Modeler |
| **Agency/Division/Firm** | OEPA |
| **Mailing Address** | 50 W. Town Street Suite 700<br>Columbus, OH 43215 |
| **E-mail Address:** | sarah.hedlund@epa.state.oh.us |
| **Telephone Number:** | 614-644-3632 |
| **FAX Number:** | 614-644-3681 |





| | |
|---|---|
| **Name:** | Ms. Sarah Potter |
| **Title:** | Project Coordinator, CMH EIS |
| **Agency/Division/Firm** | Landrum & Brown |
| **Mailing Address** | 11279 Cornell Park Drive<br>Cincinnati, OH 45242 |
| **E-mail Address:** | spotter@landrum-brown.com |
| **Telephone Number:** | 513-530-1271 |
| **FAX Number:** | 513-530-2271 |

| | |
|---|---|
| **Name:** | Ms. Virginia L. Raps |
| **Title:** | Air Quality Manager – CMH EIS |
| **Agency/Division/Firm** | Landrum & Brown |
| **Mailing Address** | 11279 Cornell Park Drive<br>Cincinnati, OH 45242 |
| **E-mail Address:** | graps@landrum-brown.com |
| **Telephone Number:** | 513-530-1238 |
| **FAX Number:** | 513-530-2238 |

## ATTACHMENT B

## ELECTRONIC FILES

The following electronic files are attached:

- "Comparison for Worst Case 080607" Microsoft EXCEL file
- Exhibit 6, Airport and Community Dispersion Receptor Locations
- Exhibit 7, Terminal Area Dispersion Receptor Locations
- "Wind Graphs" Microsoft EXCEL file

## *Federal Aviation Administration*

### ENVIRONMENTAL IMPACT STATEMENT

FOR

### REPLACEMENT RUNWAY AND TERMINAL EXPANSION

AT

### PORT COLUMBUS INTERNATIONAL AIRPORT

### AIR QUALITY TELECONFERENCE/WEB MEETING SUMMARY

**MEETING CONDUCTED**

**AUGUST 22, 2007**

**2:00 P.M. – 4:00 P.M.**

The seventh in a series of air quality scoping meetings was conducted on Wednesday, August 22, 2007. The meeting was conducted as a teleconference/web meeting for the purposes of continuing coordination of the air quality assessment for the Draft Port Columbus International Airport Environmental Impact Statement (CMH EIS). The following agencies were represented at the meeting:

- U.S. Environmental Protection Agency Region 5 (USEPA)
- Ohio Environmental Protection Agency (OEPA)
- Columbus Regional Airport Authority (CRAA)
- Federal Aviation Administration (FAA)
- FAA consultants, Landrum & Brown

The contact information for each of the participants is attached following the minutes of the meeting as **Attachment A**. A datasheet containing results of a preliminary dispersion analysis was distributed to the meeting participants in advance of the meeting and is attached to this document as **Attachment B**, which also includes a copy of the PowerPoint presentation used to facilitate the meeting discussion. The meeting discussion focused on the evaluation of the analysis conducted to support the selection of five additional receptor locations as requested in previous discussions with OEPA, which would be included in dispersion modeling for the Draft CMH EIS. **Attachment C** contains the comment letter received August 24, 2007 from OEPA and FAA's response letter dated September 6, 2007.





**Summary Notes from the August 22, 2007 Meeting[1]**

The meeting began at 2:00 p.m. Eastern Daylight Time, and was opened by Ms. Katherine Jones, FAA project manager for the CMH EIS. Ms. Jones provided a brief history of the coordination recently conducted concerning the selection of dispersion receptors for the DRAFT EIS. Ms. Jones explained that the objective of the air quality dispersion analysis for a NEPA document is to disclose and discuss the potential for a proposed project to cause significant adverse air quality impacts at the airport. This objective is met by reporting the results at the worst-case receptor, which FAA defines as the receptor, by pollutant, having the highest modeled concentration. This receptor has been shown to occur, for all pollutants, at the terminal arrival curb. Ms. Jones explained that in addition to the worst-case receptor, FAA selected for its analysis four additional receptors within the outlying communities to show the impact from the proposed project in neighborhoods believed to be sensitive by FAA and CRAA. Ms. Jones expressed FAA's desire to include OEPA and USEPA in the modeling effort and intends to consider their request for additional receptors, and pointed out that the written comment period has been extended to Friday, August 24, 2007. FAA would ask that OEPA and USEPA review the results of the evaluation presented at the meeting and respond with written comments on the methodology and procedure; and suggest changes to the location of the additional five receptors if OPEA and USEPA feel the locations selected by FAA would not accurately reflect the project's impact.

Mr. Rob Adams, the Project Manager for Landrum & Brown, explained that the FAA has an obligation to meet NEPA requirements in its preparation of air quality assessments, which include reporting the worst-case conditions and also meet requirements to address community concerns. To meet these obligations, FAA has chosen the receptors believed to meet these objectives. FAA desires to accommodate the suggestions from OEPA but also has an obligation to complete the EIS on time and on schedule as the additional receptors are not required to meet NEPA requirements.

The meeting was turned over to Virginia Raps, Air Quality Manager for L&B and the CMH EIS. Ms. Raps presented the evaluation of the ranked concentration data in a PowerPoint format. First, the background of the project was reviewed to emphasize the location of probable impacts from the project, which would be the result of relocating the south runway. An overview of prevailing winds at CMH showed that calmer winds, those 0-5 knots, would likely be the cause of the highest concentrations and could occur from any direction.

The objectives of the dispersion analysis were presented along with the methodology and procedures used for the FAA to make its selection of the worst-case receptor, the worst-case meteorological year for each pollutant, and the four other receptors located within sensitive neighborhoods. Ms. Raps explained that the air quality assessment must show the worst-case receptor, defined as the receptor with the highest concentration; report the project impacts at receptors located within nearby sensitive neighborhoods, and, as

[1] As this was a teleconference, there may be some comments attributed to Ms. Sarah Hedlund, OEPA, that were actually made by Ms. Mary Portanova, USEPA.

requested by OEPA, report concentrations at receptors that reflect the change in concentrations at areas near the project itself. The methodology was reviewed followed by the procedure used to select the worst-case receptor, the worst-case years, and evaluate the ranked concentration data.

The data for the 149 receptors was ranked highest to lowest for each pollutant.[2] The highest 15 receptors were plotted on a map of the airport and community receptors (see attachment of the PowerPoint slides) to show the shaded "hot spots," by pollutant. Ms. Raps reviewed each map and explained the characteristics of each pattern. Finally, the shaded areas showing the hot spots for each pollutant were shown superimposed on one map.

Ms. Raps explained the rationale in selecting the most likely location of impacts due to the project. The additional five receptors were selected as follows:

Receptor #32 – South of the airport, along the fence line, to pick up changes in emissions from the relocated runway. This receptor was highest among concentrations in this area for three of the five pollutants.

Receptor #12 - Northwest of the airport, along the fence line to pick up changes in emissions from Runway 10L. Both Receptors #11 and #12 were the highest in this area for three of the five pollutants. Receptor #12 was chosen because it was located closer to the runway end and would be more likely to capture emissions from Runway 10L.

Receptor #26 - This receptor was included in the hot spot-area to the east of the airport where most of the highest concentrations occurred. Receptor #26 was included in the group of the highest concentrations for four of the five pollutants and captures emissions from Runway 28R.

Receptor #27 - This is the location of the highest concentration of PM emissions due to aircraft and was considered important because Franklin County is nonattainment for $PM_{2.5}$. In addition, the concentration at this receptor reflected a value that was 10 percent of the concentration value at the arrival curb – higher than for any other receptor evaluated.

Receptor #28 - The concentration of CO was highest at this location, which is a pollutant of particular concern for airports. Also, as the proposed project includes relocating the runway farther south, it is likely that this receptor will pick up changes in project concentrations.

Ms. Raps then reviewed the rationale for the remaining receptors and those not included in the shaded areas, namely:

[2] Except for CO. The file was too large to open and the highest 15 values were extracted from the EDMS view screen..





Arrival Curb Receptor - The worst-case receptor for all pollutants.

Receptor #118 - Southwest of Runway 10R in Mifflin near Krum Park. This receptor was included in the shaded area.

Receptor #123 - South of the south runway in Whitehall.

Receptor #60 - East of Runway 28R near Morrison Road and Waterbury Blvd., which was selected in place of Receptor #96 in east Gahanna because the concentration was higher. This receptor was located in the shaded area.

Receptor #120 - North of Runway 10L/28R and in Gahanna. This receptor is very close to the receptors located on the north fence line where there are receptors with some of the highest concentrations of NOx, PM, and CO.

Following Ms. Raps' presentation the discussion was opened to comments. Mr. Bill Spires, OEPA, stated that the methodology used to select the worst-case year for each pollutant may not be accurate because the short-term averaging periods do not always reflect the highest concentration. Mr. Spires and Ms. Sarah Hedlund also expressed concern that the three-hour average concentration of SOx was not used in this preliminary analysis. Ms. Raps stated that an evaluation of the three-hour concentration of SOx would be included in the draft document.

Ms. Sherry Kamke asked if there was a difference in use of AERMOD that would create output files through EDMS that would not be in the same format as results obtained in other projects run in AERMOD by OEPA. Ms. Raps explained that EDMS is an interface with AERMOD and not every option is available to select the output format and content. The FAA requires the use of EDMS when calculating projected pollutant concentrations at airports for regulatory purposes and the interface is custom-designed for FAA purposes.

Mr. Spires stated that his team had conducted an evaluation similar to the one shown on the maps in the PowerPoint presentation and they would continue to evaluate the results of the ranked concentrations. OEPA considered the rationale supporting the selection of the additional five receptors sound, but stated that the location of the original five receptors would not necessarily be the correct ones. In their further evaluation of the data, Mr. Spires suggested that OEPA will select more community receptors that would represent the public in what OEPA considers to be more sensitive areas as compared to what the FAA had already chosen. Particularly, Ms. Sarah Hedlund stated that Receptor #48, which is located near a daycare center, would be a suitable candidate for consideration. She further stated that this receptor should not be considered a replacement for Receptor 118 or any other receptor selected by FAA, but should be in addition to the ten presented at this conference.

Mr. Rob Adams suggested that OEPA make suggestions in their written comments on what receptors they would like to see in the analysis. Mr. Spires stated that OEPA's suggestions should be in addition to the list provided by FAA and not replacements of any of the ten, as the rationale for each selection was sound. Mr. Spires expressed the opinion that OEPA did not object to the five initial receptors selected by FAA to meet their NEPA requirements. However, OEPA believes that they should not be limited in the number of receptors used in this analysis.

Ms. Hedlund asked why OEPA is being limited to just five receptors, or to ten, as previously she had been told by Ms. Jones that FAA's selections were not "set in stone." Ms. Jones clarified her position by saying that FAA is making an effort to accommodate the needs of OEPA and will not disregard OEPA's comments. Ms. Jones asked that OEPA submit their suggestions for receptor locations as written comments and include the rationale for selecting the receptor locations. For instance, suggesting Receptor #48 because there is a daycare center there, or another receptor because there is a school there.

Ms. Sherry Kamke, USEPA, stated that the group needs to come to an understanding of how to proceed. She stated that there seemed to be an element of time to consider, and the selection of the receptors does not have to be decided at this meeting.

Mr. Rob Adams suggested that the time for OEPA to do a more extensive review of the data would be when the Draft EIS is released. He asked Mr. Spires if OEPA would be able to put their recommendations in writing by Friday, August 24, 2007. Mr. Spires replied that OEPA would try to do that.

Comments Received

The FAA received written comments from OEPA dated August 24, 2007, which is attached in Attachment C. FAA intends to accommodate OEPA requests as described below:

- 3hr SO2 should be carried through the modeling process.

The three-hour concentration of SOx will be reported in the EIS for all alternatives, including existing conditions.

--------------------------------------------------------------------------------

- Absent the pollutant specific emission rates to incorporate into our evaluation of candidate receptor locations, we can not recommend alternative receptor locations by pollutant. Since all averaging times can be incorporated into a model run without computational penalties, 1, 3, 8, 24 and annual averaging times would be run.

The dispersion analysis will be conducted to calculate all five averaging periods for emissions of CO, $NO_x$, $SO_x$, $PM_{10}$, and $PM_{2.5}$. However, only the averaging periods for which NAAQS exist will be reported and evaluated in the EIS as follows:





| | |
|---|---|
| CO | 1-hour and 8-hour |
| $NO_x$ | annual |
| $SO_x$ | 3-hour, 24-hour, and annual |
| $PM_{10}$ | 24-hour |
| $PM_{2.5}$ | 24-hour and annual |

The electronic files will contain all the additional data.

--------------------------------------------------------------------------------

- Receptor #11 YMCA Daycare) and receptor #53 (Goshen Lane Elementary School) are to be retained in future analyses. If the FAA believes that it is necessary to retain the noise complaint based receptors, they should be retained.

The FAA had considered both Receptors 11 & 12. FAA initially chose #12 because the receptor is located closer to the emission source at Runway 10L, a methodology suggested in OEPA's comment letter. However, OPEA has requested the consideration of Receptor #11, which is located farther from the source but near a daycare center. FAA will include an evaluation of impacts at Receptor #11, instead of #12 as suggested by OEPA.

Receptor #53 is in close proximity to Receptor #120, which is a receptor location initially selected by FAA. While #53 is near a school, #120 is in the same neighborhood but closer to the emission source and is more likely to pick up changes in emissions from aircraft operating on Runway 10L/28R. Therefore, FAA will include an evaluation of both Receptor #53 and Receptor #120 in the dispersion analysis.

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- Currently, the documentation for the maximum receptor along International Gateway has not been provided. The choice of that receptor and the exclusion of all others should be discussed and documented in the report.

Documentation of the rationale for selecting the receptor at the arrival curb, as well as the four other initial receptor locations, was provided to OEPA, USEPA, CRAA, and MORPC on Monday, August 6, 2007, and was discussed during a teleconference on August 8, 2007. While a representative from MORPC was invited to the conference call, followed up by phone and e-mail, MORPC did not attend the conference call but received a copy of the summary of the meeting minutes. Refer to electronic file, "Comparison for Worst-Case 080607.xls," provided in advance of the meeting for documentation of methodology, procedure, and a summary of the findings indicating the maximum possible concentrations would occur at the arrival curb when compared to the over 100 other receptor locations. This documentation will be included in the EIS as part of the air quality appendix material.

- An initial set of model based receptors has been identified by FAA/L&B. The process used in the preliminary analyses included assumption on the meteorological conditions under which maximum concentrations would occur. Depending on averaging time, persistence can be as or more important than light winds. In addition, prevailing wind direction may not be as important as the direction of the closest receptor to a given source. It should also be noted that the initial grid which is being reduced is coarse to begin with and appears to be randomly placed. To perform the analysis needed to recommend the receptors which would be carried into subsequent analyses, Ohio EPA added receptors. Given that, Ohio EPA ran several days under all wind conditions and projected the maximum receptor locations for the various averaging times for individual source groups. The following are the receptors that Ohio EPA recommends be added to the previously identified model-based receptors.

The selection of a worst-case meteorological year was not based on an assumption but rather was based on an analytical evaluation of preliminary modeling results using procedures provided by OEPA during the June 19, 2007, scoping meeting. These procedures were presented to OEPA during the conference call conducted August 8, 2007. Refer to electronic file, "Comparison for Worst-Case 080607.xls," which was provided to OEPA prior to the meeting.
The FAA does not consider the grid of airport and community receptors as coarse or randomly placed. As explained in the initial scoping meeting July 19, 2006, the grid was created by establishing a receptor around the perimeter of the airport, along the property line, every 10 degrees, as measured from the Airport Reference Point. A second and third ring of receptors was included to cover the area in Franklin County well beyond the property line. The procedure was detailed in the meeting summary. No comments have been received noting any deficiency in the configuration of the larger receptor grid.

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- Ohio EPA independently performed two modeling runs using a random selection of days to determine the maximum modeled concentration for each pollutant. The following receptors have been chosen by Ohio EPA to be

evaluated by FAA for the Port Columbus International Airport Environmental Impact Statement. Justification for each chosen receptor is provided.

**1-hour**

Receptor #119 has the highest 1-hour concentration.

The dispersion analysis will include an evaluation of impacts at Receptor #119.

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**3-hour**

Receptor #11 has the highest 3-hour concentration. The Franklin County Mental Retardation and Developmental Disabilities facility shares a fenceline with Port Columbus Airport. The YMCA operates an all daycare for young children within the Franklin County MRDD building.

**8-hour**

Receptor #13 has the highest 8-hour concentration. The maximum modeled concentration is slightly higher than the modeled concentration at receptor #11. As a result, Ohio EPA is willing to accept the modeled concentration at receptor #11 as representative of the highest 8-hour concentration. Receptor #13 does not need to be evaluated in the Environmental Impact Statement.

The dispersion analysis will include an evaluation of impacts at Receptor #11, as discussed above.

**24-hour**

Receptor #32 has the highest 24-hour concentration. Receptor #32, located on the southern fenceline, will allow Ohio EPA to measure the impact of the project.

Receptor #12 has the highest 24 hour concentration. The maximum modeled concentration is slightly higher than the modeled concentration at receptor #11. As a result, the Ohio EPA is willing to accept the modeled concentration at receptor #11 as representative of the highest 24 hour concentration. Receptor #12 does not need to be evaluated in the Environmental Impact Statement.

**Annual**

Receptor #32 has the highest annual concentration. Ohio EPA considers receptor #32 to be a critical receptor to be evaluated because it has the highest modeled concentration for two averaging periods.

The FAA referred to Receptor #32 in the August 22, 2007, conference call presentation as the location where changes in emissions from the south runway would mostly likely be detected, which is where the major portion of the CMH proposed project would occur. Emissions of three of the five pollutants resulted in high emissions at #32. The dispersion analysis will include an evaluation of impacts at Receptor #32.

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**Additional Receptors**

Receptor #53: Ohio EPA has chosen receptor #53 due to its proximity to Goshen Lane Elementary School. Although Goshen Lane Elementary may not voice noise complaints, the students are considered sensitive receptors.

Receptor (2303.55,-407.43): A receptor shall be placed on the airport golf course due to public access. The airport golf course is considered ambient air, therefore shall be evaluated.

The analysis will also include an evaluation of impacts at Receptor #53, as discussed previously.

Although the golf course is located within the airport property line, the course is within an area considered to be ambient air. Therefore, the dispersion analysis will include an evaluation of impacts at a receptor placed at 2303.55,-407.43 meters, located within the golf course, as suggested by OEPA.

The full set of receptors that will be evaluated in the EIS include:

1 - Arrival curb
2 - #60
3. - #123
4. - #118
5. - #120
6. - #32
7. - Golf course receptor
8. - #119
9. - #11
10. - #53

Next Steps

Additional comments or requests relating to this scoping meeting should be provided ***in writing to the FAA no later than September 24, 2007***. Comments should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road
Suite 107
Romulus, Michigan 48174
**Email:** CMHEIS@FAA.GOV
**Website:** www.Airportsites.net/CMH-EIS





**ATTACHMENT A**

**MEETING PARTICIPANTS**

The following is a list of the meeting participants, which attended either in person or by teleconference.

| | |
|---|---|
| **Name:** | Mr. Bill Spires, C.C.M. |
| **Title:** | Manager, SIP Section |
| **Agency/Division/Firm** | OEPA Division of Air Pollution Control |
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| **Name:** | Mr. David Wall, A.A.E. |
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| **Name:** | Sherry A. Kamke *(teleconference participant)* |

| | |
|---|---|
| **Title:** | Environmental Scientist, NEPA Implementation Section<br>Office of Science, Ecosystems, and Communities |
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| | |
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| | |
|---|---|
| **Name:** | Ms. Mary Portanova |
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| **FAX Number:** | 312-886-5824 |

**Name:** Mr. Rob Adams





| | |
|---|---|
| **Title:** | Managing Director, Project Manager CMH EIS |
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| | |
|---|---|
| **Name:** | Ms. Virginia L. Raps |
| **Title:** | Air Quality Manager – CMH EIS |
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| **FAX Number:** | 513-530-2238 |

## ATTACHMENT B

## ELECTRONIC FILES

The following electronic files are attached:

- Discussion Presentation
- Datasheet of Ranked Dispersion Analysis Results

## ATTACHMENT C

## COORDINATION LETTER

OEPA comment letter, dated August 24, 2007, in electronic format, is attached.

FAA response to OEPA comment letter, dated September 6, 2007, in electronic format, is attached.

# Air Quality

## Environmental Impact Statement

### Port Columbus International Airport

Presented to: Air Quality Teleconference

By: Katherine Jones, FAA CMH Project Manger
Rob Adams, L&B CMH Project Manager
Virginia Raps, L&B CMH Air Quality Manager

Date: Wednesday, August 22, 2007

DRAFT Deliberative Material - DO NOT CITE OR QUOTE


# DRAFT Deliberative Material - DO NOT CITE OR QUOTE

***This scoping document is provided as a draft and should not be considered the final authority for assessing air quality for either the Draft CMH EIS or Final CMH EIS. As the project progresses, changes in planning will require adjustments of the methodology, procedures, and information given in this document.***

# AGENDA

I. INTRODUCTION
II. PROJECT AIR QUALITY IMPACTS
III. OBJECTIVES
IV. METHODOLOGY
V. PROCEDURE
VI. SUMMARY



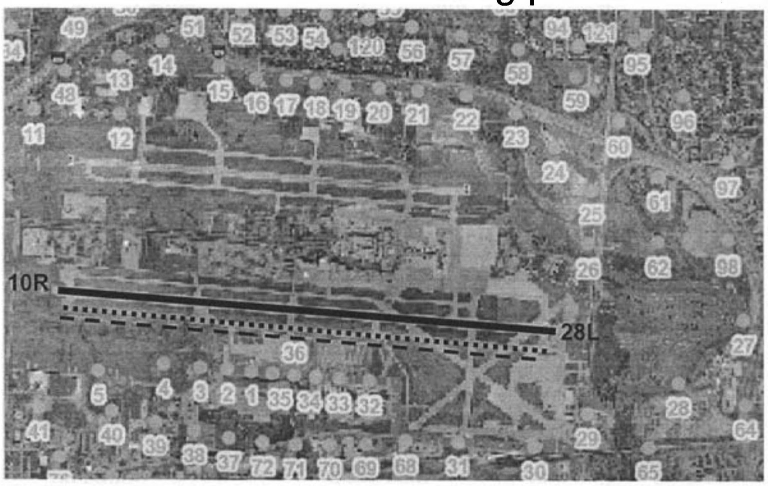
# I. INTRODUCTION

Katherine Jones
Federal Aviation Administration (FAA) Project Manager
Port Columbus International Airport (CMH EIS)

Rob Adams
Landrum & Brown (L&B) Project Manager
Port Columbus International Airport (CMH EIS)

# II. PROJECT AIR QUALITY IMPACTS

Main feature of the Proposed Project that will affect emission concentrations is the relocation of Runway 28L farther south than the existing position.

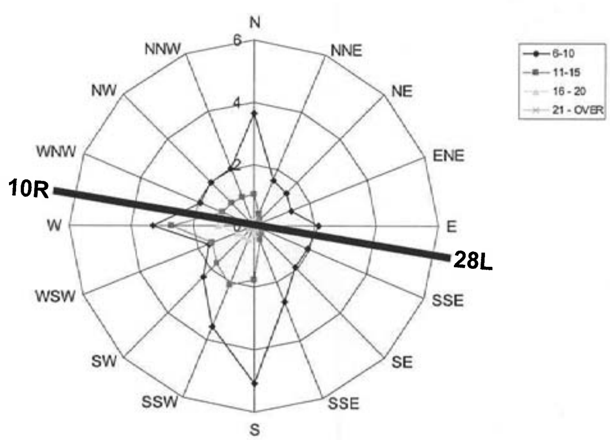



Changes in runway-use with the noise compatibility program will also change the distribution of aircraft on the airfield.



## Prevailing Winds

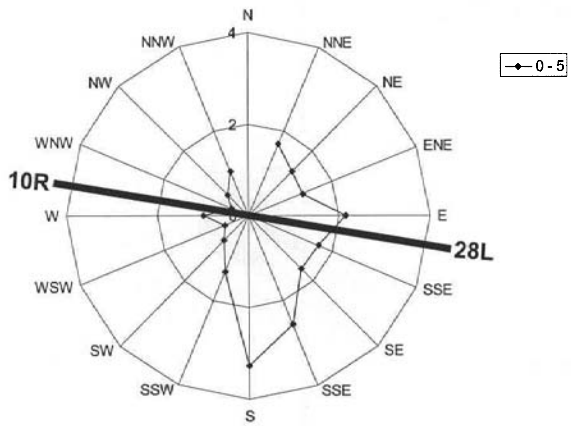
| KNOTS | N | NNE | NE | ENE | E | SSE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 - 5 | 19.24 | 1.69 | 1.38 | 1.29 | 2.16 | 1.67 | 1.65 | 2.55 | 3.27 | 1.33 | 0.77 | 0.56 | 0.99 | 0.4 | 0.65 | 1.05 | 40.65 |
| 6-10 | 3.65 | 1.61 | 1.48 | 1.31 | 2.12 | 1.9 | 1.93 | 2.65 | 5.09 | 3.53 | 2.37 | 1.61 | 3.3 | 1.9 | 1.97 | 2.02 | 38.44 |
| 11-15 | 1.02 | 0.42 | 0.25 | 0.18 | 0.23 | 0.23 | 0.38 | 0.49 | 1.75 | 2.06 | 1.71 | 1.47 | 2.68 | 1.11 | 1.05 | 0.98 | 16.01 |
| 16 - 20 | 0.14 | 0.04 | 0.02 | 0 | 0 | 0.03 | 0.04 | 0.08 | 0.25 | 0.47 | 0.5 | 0.58 | 1.18 | 0.27 | 0.2 | 0.17 | 3.97 |
| 21 - OVER | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.06 | 0.13 | 0.23 | 0.41 | 0.04 | 0.02 | 0.01 | 0.93 |




- Prevailing winds are south through west, particularly at 11-15 knots.
- These winds may be too strong to cause high concentrations.

## Prevailing Winds – 0 to 5 Knots (calm)

| KNOTS | N | NNE | NE | ENE | E | SSE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 - 5 | 19.24 | 1.69 | 1.38 | 1.29 | 2.16 | 1.67 | 1.65 | 2.55 | 3.27 | 1.33 | 0.77 | 0.56 | 0.99 | 0.4 | 0.65 | 1.05 | 40.65 |
| 6-10 | 3.65 | 1.61 | 1.48 | 1.31 | 2.12 | 1.9 | 1.93 | 2.65 | 5.09 | 3.53 | 2.37 | 1.61 | 3.3 | 1.9 | 1.97 | 2.02 | 38.44 |
| 11-15 | 1.02 | 0.42 | 0.25 | 0.18 | 0.23 | 0.23 | 0.38 | 0.49 | 1.75 | 2.06 | 1.71 | 1.47 | 2.68 | 1.11 | 1.05 | 0.98 | 16.01 |
| 16 - 20 | 0.14 | 0.04 | 0.02 | 0 | 0 | 0.03 | 0.04 | 0.08 | 0.25 | 0.47 | 0.5 | 0.58 | 1.18 | 0.27 | 0.2 | 0.17 | 3.97 |
| 21 - OVER | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.06 | 0.13 | 0.23 | 0.41 | 0.04 | 0.02 | 0.01 | 0.93 |




- Nearly calm winds are from all directions.
- North wind is exaggerated.
- Expect impacts on all sides.



# III. OBJECTIVES

- Report the receptor with the highest concentration for comparison to the NAAQS
- Report project impacts at receptors located within nearby sensitive neighborhoods
- Report concentrations at receptors that reflect the impact of the most affected project source group

# IV. METHODOLOGY

- Locate the area with the highest concentration values for each pollutant
- Isolate the maximum receptors and apply all five years of weather data
- Select the worst-case meteorological year for each pollutant
- Select four additional receptors that will reflect the project impacts in the surrounding neighborhoods
- Select five additional receptors that will reflect the project impacts associated with the replacement runway



# V. PROCEDURE

- Conducted preliminary dispersion analysis applying one year of weather data for each pollutant to all receptors – the year 2005 was used as the existing year, using 149 receptors, using the preliminary study for existing conditions at CMH; represented by the "071407" run.

| NOX | | CO | | PM10 | | PM2.5 | | SOx | |
|---|---|---|---|---|---|---|---|---|---|
| 2005 | | 2005 | | 2005 | | 2005 | | 2005 | |
| TR32 | 58.48 | Curb | 24715.9 | Curb | 7.9 | Curb | 7.56 | Curb | 35.739 |
| Garage | 44.41 | Garage | 20515.4 | Garage | 6.2 | Garage | 5.79 | Garage | 21.197 |
| TR32 | 39.9 | TR32 | 14993.7 | TR32 | 5.7 | TR32 | 4.23 | TR37 | 11.638 |
| Curb | 39.72 | TR38 | 12159.1 | AR9 | 3.72 | TR39 | 3.12 | TR39 | 11.524 |
| TR35 | 34.85 | TR37 | 11876.1 | TR35 | 3.67 | TR37 | 3.10 | TR34 | 10.262 |

Highest concentrations were at the terminal arrival and departure curbs, the terminal garage, and along International Gateway just before the terminal garage. "Controlling" averaging periods were identified as the shortest NAAQS averaging period for each pollutant.

## Isolate the maximum receptors and apply all five years of weather data

- Repeated the analysis applying all five years of weather data, for each pollutant, to the receptors in the terminal core – the results were reported for the "080607" run

| NOx 2003 | | PM2.5 2002 | | CO 2001 | | PM10 2002 | | SOx 2005 | |
|---|---|---|---|---|---|---|---|---|---|
| Arr Curb | 48.403 | Arr Curb | 7.462 | Arr Curb | 12,738 | Arr Curb | 8.036 | Arr Curb | 46.158 |
| RAC LVL1 | 41.186 | Dep Curb | 5.592 | RAC LVL1 | 10,825 | RAC LVL1 | 6.046 | Dep Curb | 36.158 |
| Dep Curb | 38.151 | RAC LVL1 | 5.591 | T22 | 9,285 | Dep Curb | 6.011 | RAC LVL1 | 20.380 |
| RAC LVL2 | 35.262 | RAC LVL2 | 4.482 | T23 | 9,151 | Lng Term LVL3 | 5.094 | RAC LVL2 | 19.680 |
| T13 | 31.895 | T12 | 4.118 | Dep Curb | 9,021 | RAC LVL2 | 4.937 | Short Term LVL4 | 18.891 |

Highest concentrations were at the terminal arrival curb. Worst-case meteorological year was identified.

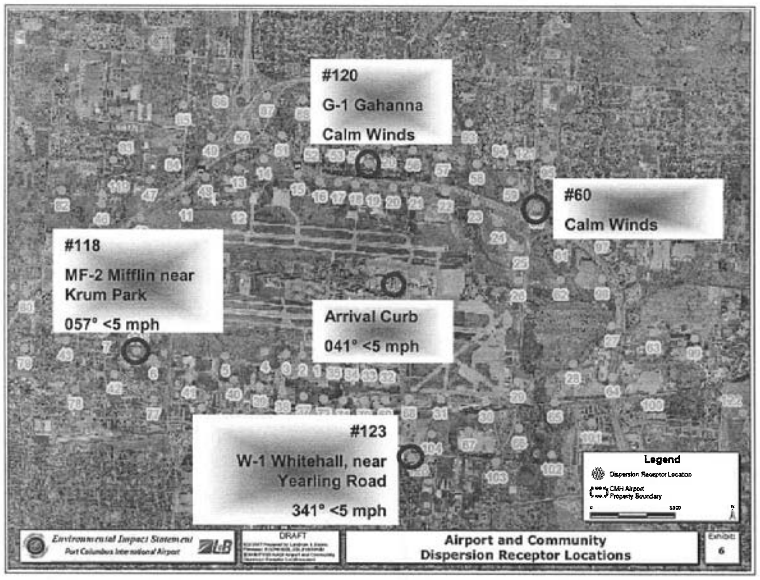


## Selection of four receptors in the community

FAA and CRAA selected four receptors that would reflect the project impact in four sensitive neighborhoods around the airport.

- NORTH: Receptor 120 (G-1) in Gahanna
- NORTHEAST: Receptor 60, near the interchange of I-270 and Rt. 317
- SOUTH: Receptor 123 (W-1) in Whitehall
- SOUTHWEST: Receptor 118 (MF-2) in Mifflin near Krum Park

## Location of five receptors




Wind direction and speed was extracted from the 1-hour CO concentration (AERMOD) file and cross-referenced with the AERMOD 2001 weather file.

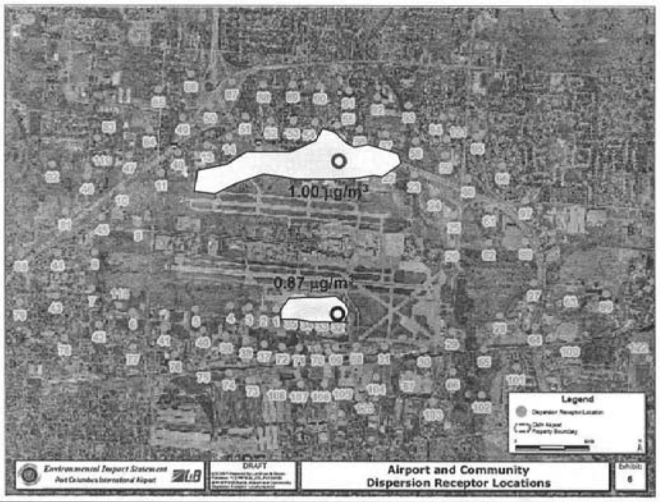


## Identify five additional receptors to capture the impact from aircraft on a relocated south runway

- The results of the “071407” run was revisited to evaluate the airport and community receptors with the highest values, by source group
- Evaluation did not consider terminal core receptors
- For each pollutant, for the associated worst-case year, results of dispersion analysis (*.CON files from AERMOD) were opened and sorted in EXCEL and ACCESS.
- CO file was too large and was sorted using EDMS.
- Concentrations were ranked highest to lowest, showing the highest concentration for each receptor.
- Top 15 receptors, where emissions were caused by aircraft alone, were plotted on the map (Exhibit 6).

## Patterns of highest concentrations - NOx

NOx concentrations were highest to the north, remainder were to the south. Curb concentration 48.40 $\mu g/m^3$

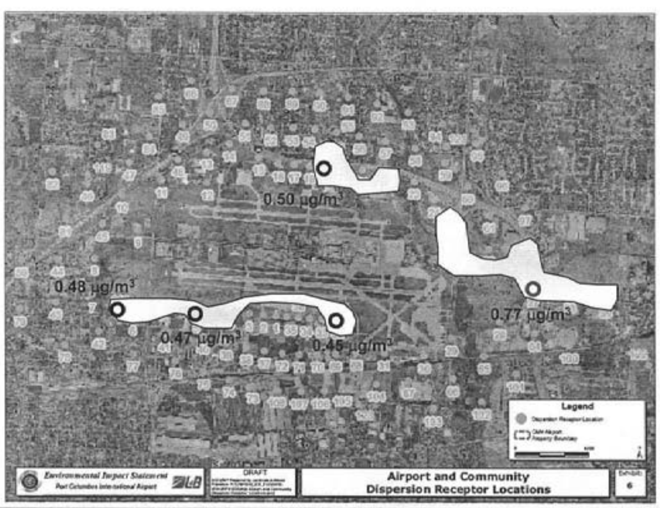



- Maximum north receptor was #20
- Highest south receptor was #32



## Patterns of highest concentrations – $PM_{2.5}$

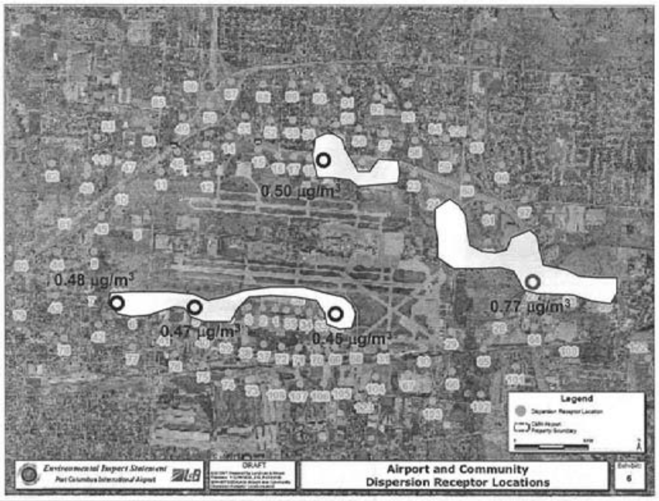
$PM_{2.5}$ concentrations were highest to the east. Curb concentration 7.46 $\mu g/m^3$




- Maximum east receptor was #27
- Highest north receptor was #19
- Highest southwest receptor was #118 (MIF-2)
- Highest south receptor was #5

## Patterns of highest concentrations – $PM_{10}$

$PM_{10}$ concentrations were highest to the east (same as for $PM_{2.5}$). Curb concentration 8.04 $\mu g/m^3$

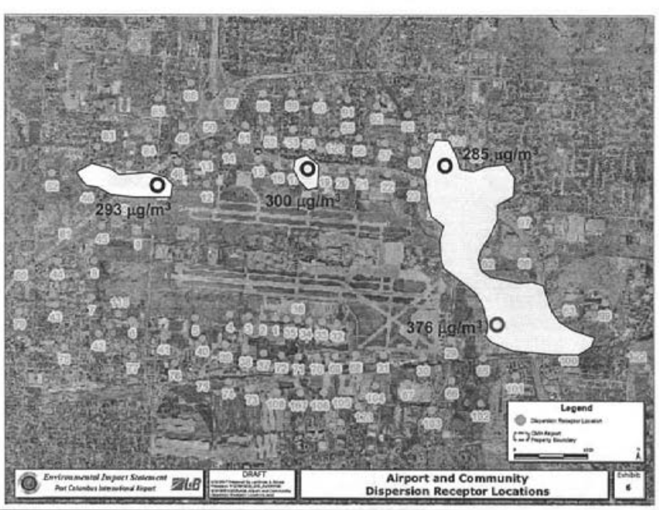



- Maximum east receptor was #27
- Highest north receptor was #19
- Highest southwest receptor was #118 (MIF-2)
- Highest south receptor was #5



## Patterns of highest concentrations – CO

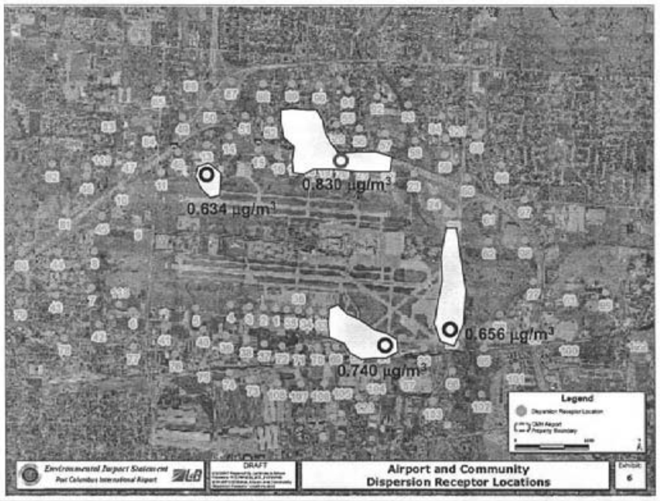
CO concentrations were highest to the southeast, with a few located north and northwest. Curb concentration 12,738 $\mu g/m^3$




- Maximum southeast receptor was #28
- Highest north receptor was #18
- Highest northwest receptor was #11
- Highest northeast receptor was #59

## Patterns of highest concentrations – SOx

SOx concentrations were highest mostly to the north and south. Curb concentration 46.16 $\mu g/m^3$

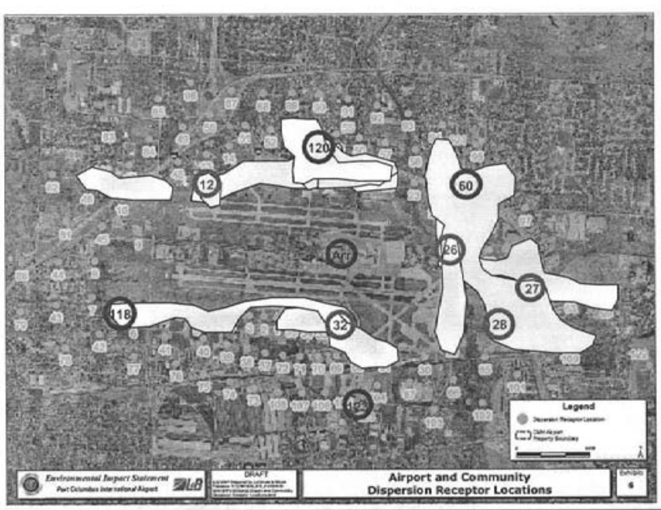



- Maximum north receptor was #20
- Highest south receptor was #31
- Highest southeast receptor was #29
- Highest northwest receptor was #12



# VI. SUMMARY

- Receptor #32 is among the higher concentrations for 3 of the 5 the pollutants and should pick up changes in the south runway.
- Receptor #11 & #12 are among the higher concentrations for 3 of the 5 pollutants. #12 is closest to the runway.




- Receptor 120 (G-1) is close enough to represent Receptors 18-21 and is one of the original 5 FAA selections.
- Receptor #118 (MIF-2) was found to have consistently higher values than #119 (MIF-1) when all years were reviewed and is one of the original 5 receptors FAA selected.
- Receptor #26 is included in the group of higher concentrations for 4 of the 5 pollutants.
- Receptor #27 concentrations are 10% of the curb value for PM.
- Receptor #28 picked up the highest CO resulting from northwest winds.

## Schedule for Comments and Recommendations

- Comments requested no later than ***Friday*, *August 24, 2007***



## Questions and comments on the CMH EIS Air Quality Assessment should be directed to:

Ms. Katherine Jones
Federal Aviation Administration
Detroit Airports District Office
11677 South Wayne Road, Suite 107
Romulus, MI 48174
E-mail: CMHEIS@FAA.GOV
Web site: www.Airportsites.net/CMH-EIS

**Ohio EPA**

State of Ohio Environmental Protection Agency

STREET ADDRESS: | MAILING ADDRESS:

Lazarus Government Center
50 W. Town St., Suite 700
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184
www.epa.state.oh.us

P.O. Box 1049
Columbus, OH 43216-1049

August 24, 2007

Katherine S. Jones
FAA, Detroit Airports DO
11677 South Wayne Rd
Romulus Michigan 48174

Re: Port Columbus runway relocation

Dear Ms. Jones:

I am writing to submit comments with respect to the current design for review of the environmental impact for the planned Port Columbus runway relocation project. Per your request, we are submitting comments regarding the unresolved modeling issues, by August 24, 2007.

I am disappointed with the effort it has taken to acknowledge and incorporate Ohio EPA staff input during their attempts to assist in the facilitation of meetings and the review of the approach for the environmental review associated with this proposed project. It has been my belief that both U.S. EPA and Ohio EPA rules not only allow our review, but require projects funded by the federal government to conform with the state implementation plan (SIP). My staff comments are directly related to compliance with the SIP and the potential impacts of the project on the community and especially the local sensitive population and I do not believe these comments can be ignored.

Though effort has been made recently by the FAA to improve the lack of consideration of Ohio EPA comments through teleconferences on August 10, 2007, August 13, 2007 and August 22, 2007, it does not change what has occurred over the last year or why we are still attempting to address the specific issues at hand.

In terms of the evaluation of the ambient impact associated with this project, it appears that the actual impact of the requested runway relocation had not previously been a consideration in the plan for evaluation of this project. Parameters for the reduced ambient impact analysis (the basis for determining receptors and meteorological data sets to be used for the remainder of the analyses) have not taken into account any evaluation of the proposed future case. The purpose of air dispersion modeling is to evaluate both the worst case impacts and the potential changes in air quality should the project be approved.



While Ohio EPA is concerned about the ambient air concentrations at individual homes in the area, the few selected receptors proposed by FAA and the contractor reflect locations chosen on the basis of noise complaints and do necessarily represent a majority of the population and also does not attempt to address possible locations of especially sensitive individuals who will be affected by this project. In order to provide an accurate representation of air quality, the modeling must be completed over a wider representative area with consideration for both maximum impacts due to the project and include special consideration to any sensitive populations.

A written summary of the meeting held June 19, 2006 at Ohio EPA, provided by Virginia Raps at Landrum and Brown, states "The final number and location of discrete receptors will be determined by the FAA project manager, Ms. Katherine Jones, following consultation with OPEA, USEPA, CRAA, and MORPC." Ohio EPA was not consulted by the FAA on the number or location of the receptors chosen. In addition, it is Ohio EPA's understanding that MORPC and U.S. EPA also were not consulted as agreed. Until the most recent discussions, it is apparent that this process was going forward without consideration of outside input.

During the August 8, 2007 Web conference, the FAA and Landrum and Brown mentioned two opportunities Ohio EPA had to comment on the number and location of the receptors and that no comments were received. Ohio EPA believes that the first opportunity to comment came after a teleconference discussion held on July 19, 2006. Ohio EPA did provide comments to the FAA on August 16, 2006, stating "the location of these receptors should be based on the number of hot spots, the location of any special 'sensitive' receptors and the gradient of the concentration. These locations can not be predetermined". Ohio EPA is also aware that U.S. EPA also provided written comments expressing similar concerns.

Ohio EPA believes that the second opportunity to comment came after the June 19, 2007 meeting. Ohio EPA could not advise the FAA as to which receptors would be appropriate to evaluate without the opportunity to review modeled concentrations for each pollutant. No modeling input files were supplied to Ohio EPA until after the July 19, 2007 comment deadline. Even then, only partial information was provided.

In an effort to utilize the initial modeling results to recommend an appropriate reduced receptor grid, Ohio EPA requested and received a portion of the AERMOD input files. In order to save resource of the federal government, Ohio EPA was willing to identify overall peak impact locations as well as the location of the peak impacts due to source groups and the receptor locations that would be most affected by the proposed change. The lack of complete input files, though, have prevented Ohio EPA from providing a comprehensive review based on modeling results. The attached recommendations are based on the partial information available and reflect peak project impact receptors for the various averaging periods as well as specific sensitive receptor locations.

The FAA consultant has stated that the number of model receptors used in the Columbus analysis is the minimal required and that choice had been based solely on the run time needed for the computer to complete the analysis. Ohio EPA cannot accept an inadequate analysis because the consultant to the FAA lacks adequate computational capacity. The number and location of receptors should be sufficient to answer any concerns about the impact of a proposed project, both from the vocal community and those who can not speak for themselves. We are aware that similar efforts to reduce receptors and the number of meteorological years modeled has been attempted in projects in Florida, Philadelphia and Chicago and similar comments to those expressed by Ohio EPA and U.S. EPA reviewers were expressed indicating that shortcuts in the analyses solely to save time and money are not acceptable.

We have no desire to unnecessarily delay this project, but we must insist that a minimally acceptable air quality analysis be performed. It is in both of our interests that we resolve these air quality issues as soon as possible. We are public agencies and should focus our energies in serving the needs of the public. Please contact Sarah Hedlund at (614) 644-3632 or Sam MacDonald at (614) 728-1743 as soon as possible so that we can resolve thee air quality issues at this time and avoid a more serious delay later if the FAA fails to conform to the U.S. EPA and Ohio EPA regulations.

Sincerely,

Robert F. Hodanbosi
Chief, Division of Air Pollution Control

cc: Patricia Morris, U.S. EPA, Region 5

**Specific Comments**

- 3hr SO2 should be carried through the modeling process.

- Absent the pollutant specific emission rates to incorporate into our evaluation of candidate receptor locations, we can not recommend alternative receptor locations by pollutant. Since all averaging times can be incorporated into a model run without computational penalties, 1, 3, 8, 24 and annual averaging times would be run.

- As part of the modeling report, documentation of the process for development of the AERMET and receptor information (AERMAP) should be described and the input files for these program are to be included in the reports.

- Receptor #11 YMCA Daycare) and receptor #53 (Goshen Lane Elementary School) are to be retained in future analyses. If the FAA believes that it is necessary to retain the noise complaint based receptors, they should be retained.

- Currently, the documentation for the maximum receptor along International Gateway has not been provided. The choice of that receptor and the exclusion of all others should be discussed and documented in the report.

- An initial set of model based receptors has been identified by FAA/L&B. The process used in the preliminary analyses included assumption on the meteorological conditions under which maximum concentrations would occur. Depending on averaging time, persistence can be as or more important than light winds. In addition, prevailing wind direction may not be as important as the direction of the closest receptor to a given source. It should also be noted that the initial grid which is being reduced is coarse to begin with and appears to be randomly placed. To perform the analysis needed to recommend the receptors which would be carried into subsequent analyses, Ohio EPA added receptors. Given that, Ohio EPA ran several days under all wind conditions and projected the maximum receptor locations for the various averaging times for individual source groups. The following are the receptors that Ohio EPA recommends be added to the previously identified model-based receptors.

- Ohio EPA independently performed two modeling runs using a random selection of days to determine the maximum modeled concentration for each pollutant. The following receptors have been chosen by Ohio EPA to be evaluated by FAA for the Port Columbus International Airport Environmental Impact Statement. Justification for each chosen receptor is provided.

**1-hour**

Receptor #119 has the highest 1-hour concentration.

**3-hour**

Receptor #11 has the highest 3-hour concentration. The Franklin County Mental Retardation and Developmental Disabilities facility shares a fenceline with Port Columbus Airport. The YMCA operates an all daycare for young children within the Franklin County MRDD building.

**8-hour**

Receptor #13 has the highest 8-hour concentration. The maximum modeled concentration is slightly higher than the modeled concentration at receptor #11. As a result, Ohio EPA is willing to accept the modeled concentration at receptor #11 as representative of the highest 8-hour concentration. Receptor #13 does not need to be evaluated in the Environmental Impact Statement.

**24-hour**

Receptor #32 has the highest 24-hour concentration. Receptor #32, located on the southern fenceline, will allow Ohio EPA to measure the impact of the project.

Receptor #12 has the highest 24 hour concentration. The maximum modeled concentration is slightly higher than the modeled concentration at receptor #11. As a result, the Ohio EPA is willing to accept the modeled concentration at receptor #11 as representative of the highest 24 hour concentration. Receptor #12 does not need to be evaluated in the Environmental Impact Statement.

**Annual**

Receptor #32 has the highest annual concentration. Ohio EPA considers receptor #32 to be a critical receptor to be evaluated because it has the highest modeled concentration for two averaging periods.

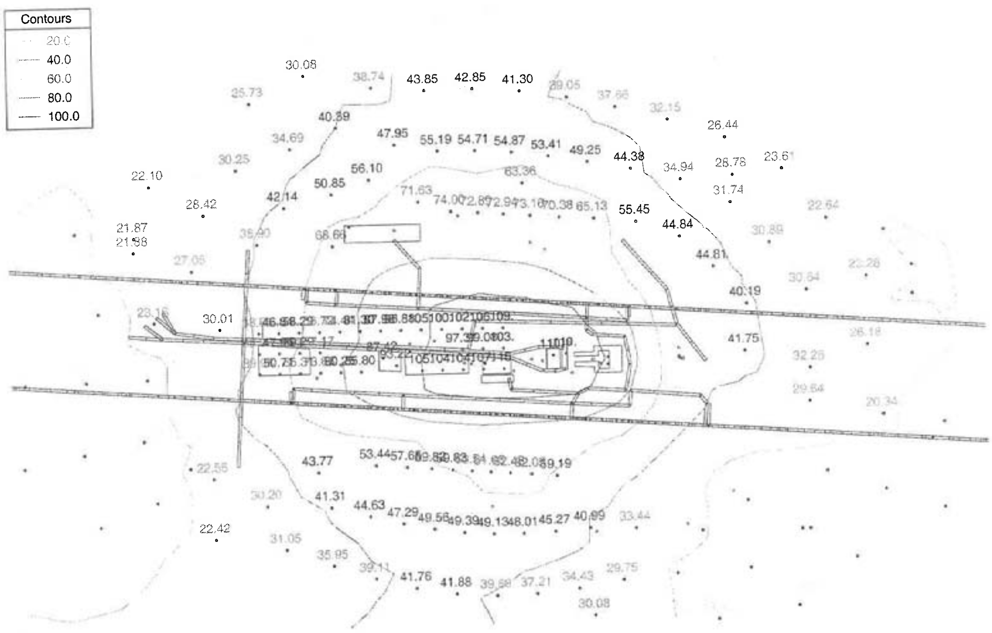
**Additional Receptors**

Receptor #53: Ohio EPA has chosen receptor #53 due to its proximity to Goshen Lane Elementary School. Although Goshen Lane Elementary may not voice noise complaints, the students are considered sensitive receptors.

Receptor (2303.55,-407.43): A receptor shall be placed on the airport golf course due to public access. The airport golf course is considered ambient air, therefore shall be evaluated.

C:\BACKUP\MODELS\CMH2a_01_OtherPM.GRF

CMH06PM2A24



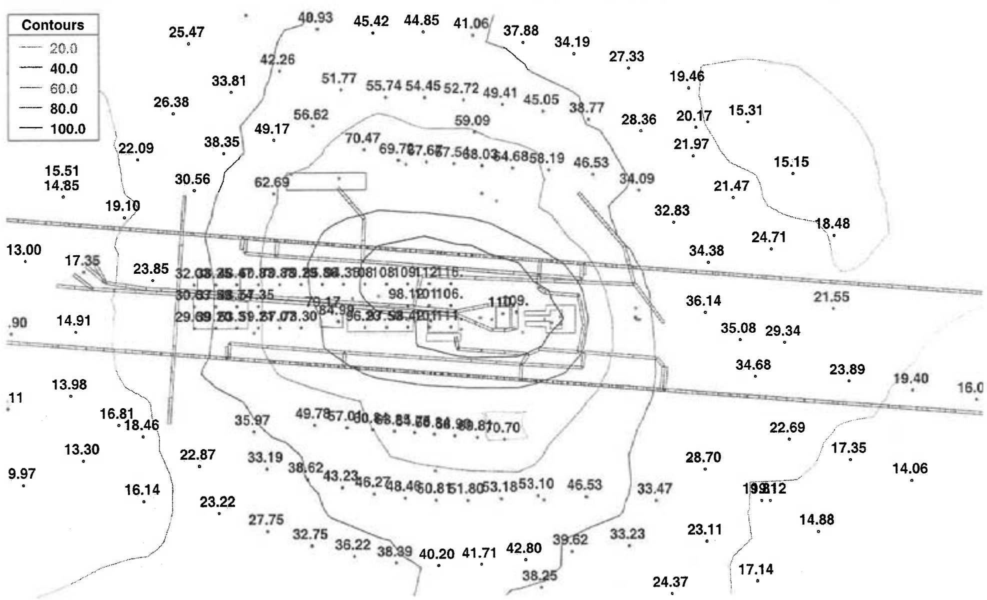

Scale: 1" = 843.7 Meters

PERIOD VALUES FOR GROUP: AIRCRAFT

Max = 114.69633 (140.82, -42.37)

CMH06PM2A24

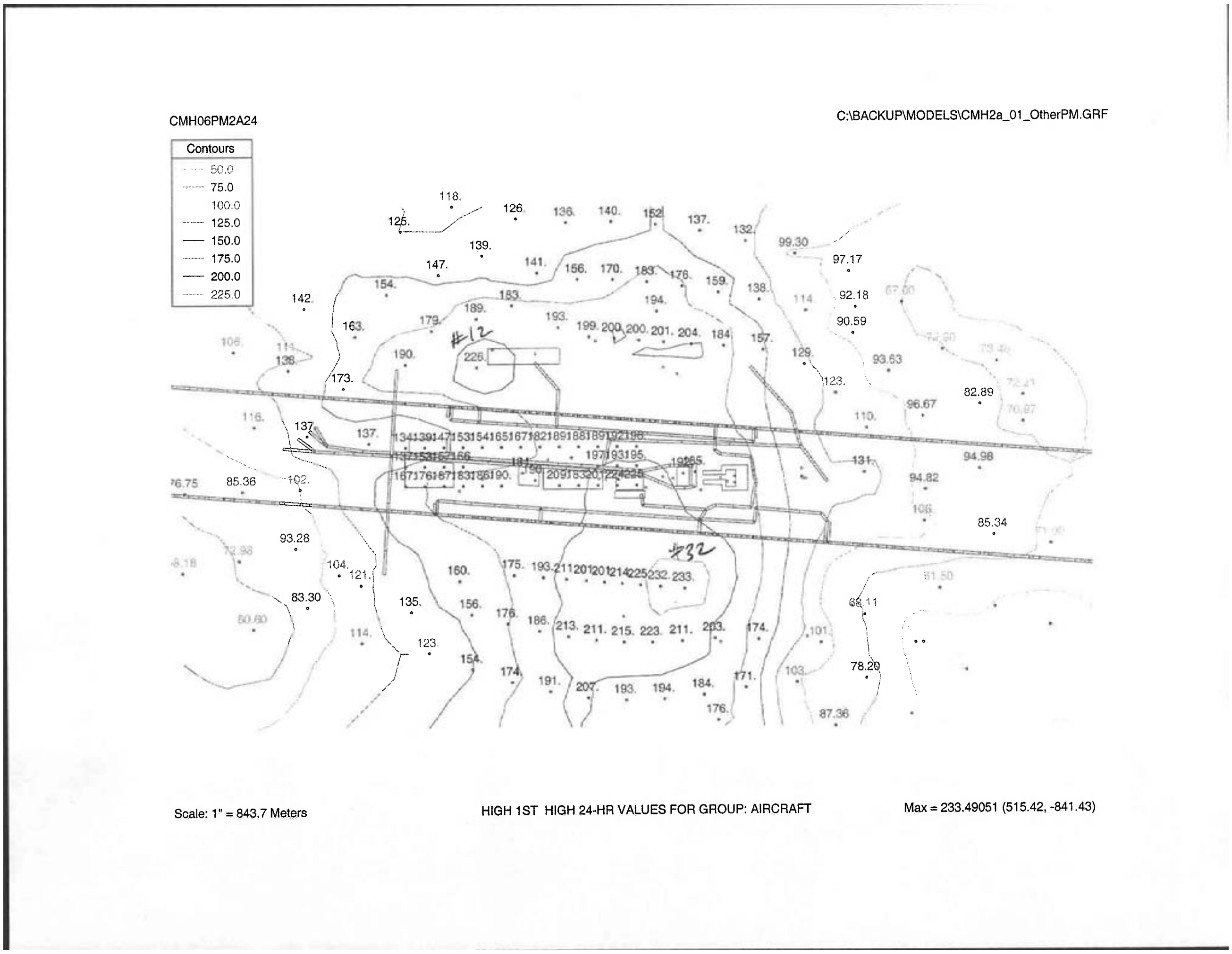
C:\Models\Port Columbus\Draft Runs\OEPA Draft Run_01_OtherPM.GRF




Scale: 1" = 802.1 Meters

ANNUAL VALUES FOR GROUP: AIRCRAFT

Max = 115.88161 (140.82, 262.43)


CMH06PM2A24
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Contours
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125.0
150.0
175.0
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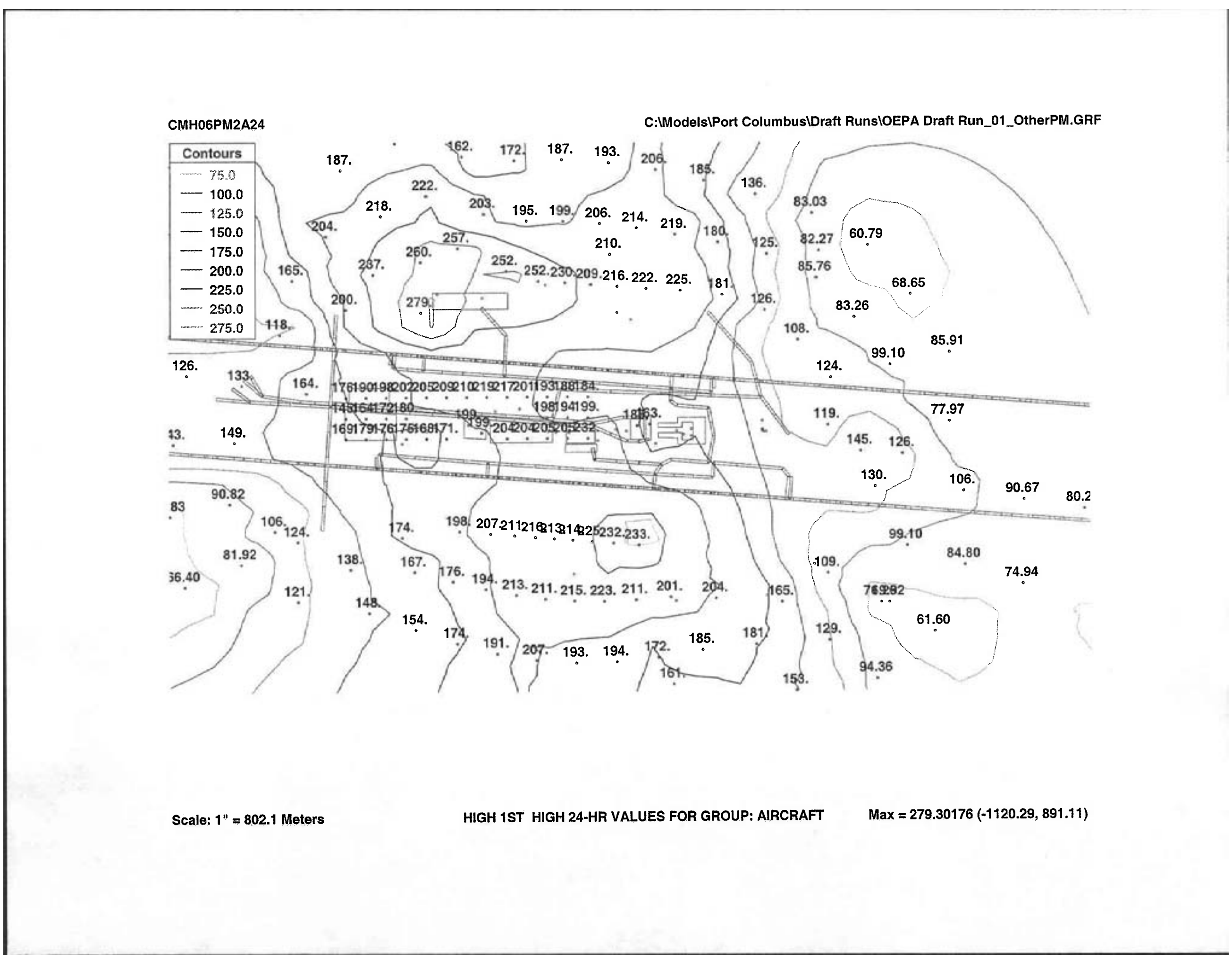
Scale: 1" = 843.7 Meters
HIGH 1ST HIGH 24-HR VALUES FOR GROUP: AIRCRAFT
Max = 233.49051 (515.42, -841.43)


CMH06PM2A24
C:\Models\Port Columbus\Draft Runs\OEPA Draft Run_01_OtherPM.GRF
Contours
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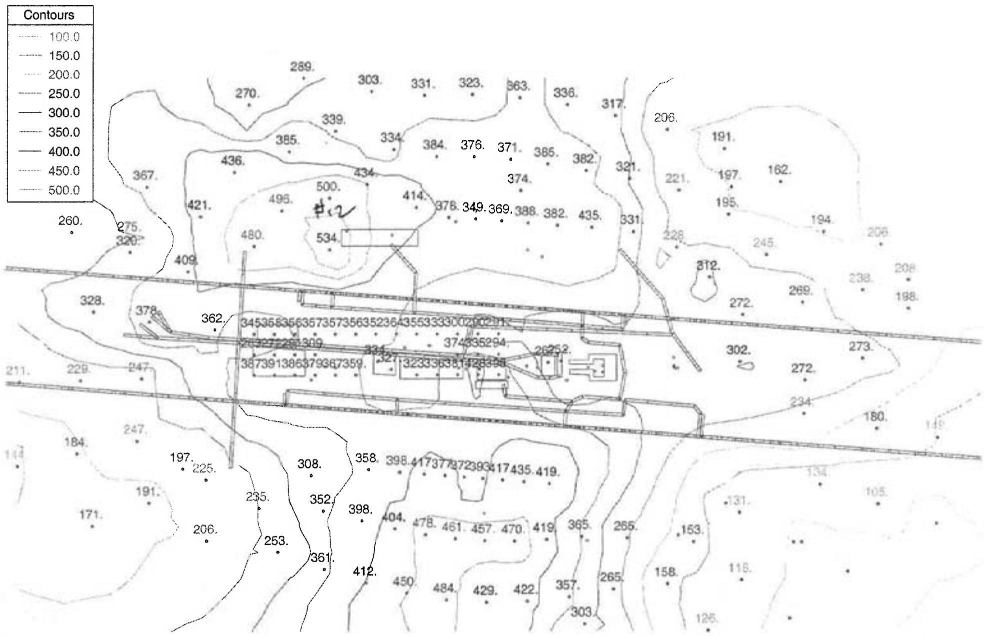
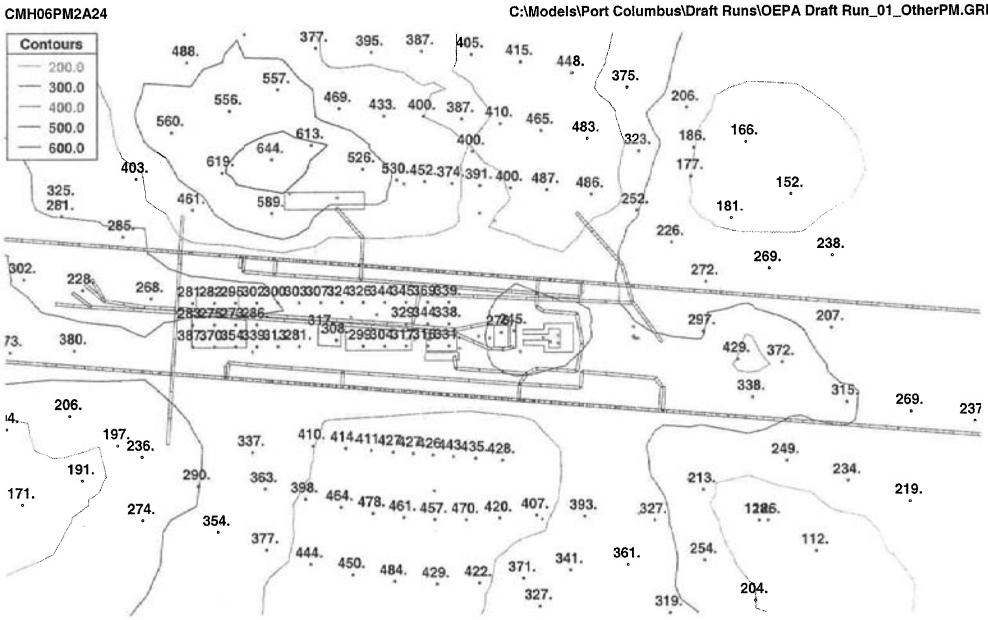
100.0
125.0
150.0
175.0
200.0
225.0
250.0
275.0
Scale: 1" = 802.1 Meters
HIGH 1ST HIGH 24-HR VALUES FOR GROUP: AIRCRAFT
Max = 279.30176 (-1120.29, 891.11)

CMH06PM2A24 C:\BACKUP\MODELS\CMH2a_01_OtherPM.GRF



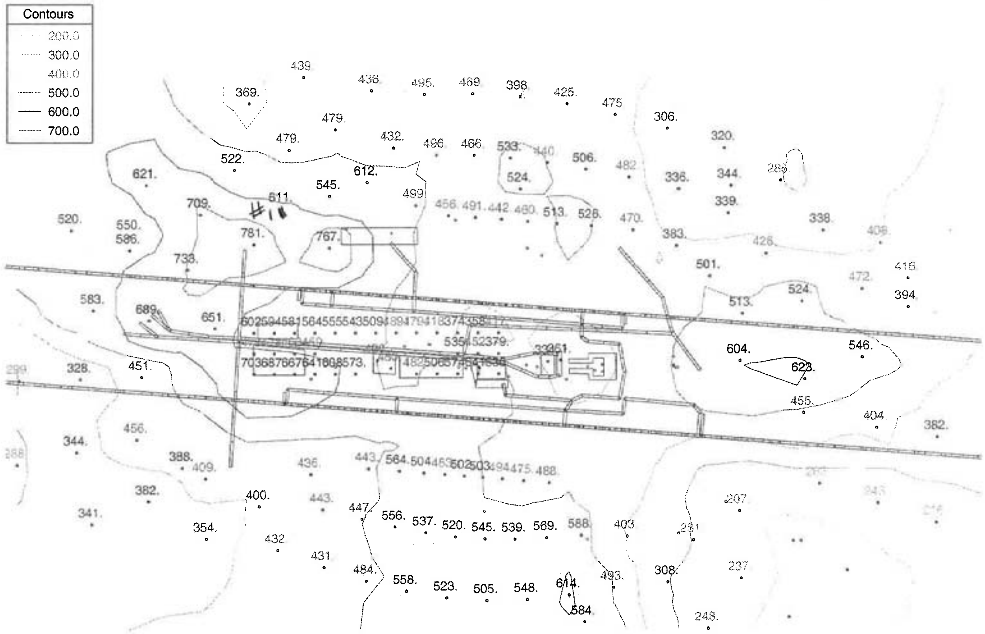

Scale: 1" = 843.7 Meters HIGH 1ST HIGH 8-HR VALUES FOR GROUP: AIRCRAFT Max = 533.82727 (-1120.29, 891.11)

CMH06PM2A24 C:\Models\Port Columbus\Draft Runs\OEPA Draft Run_01_OtherPM.GRF



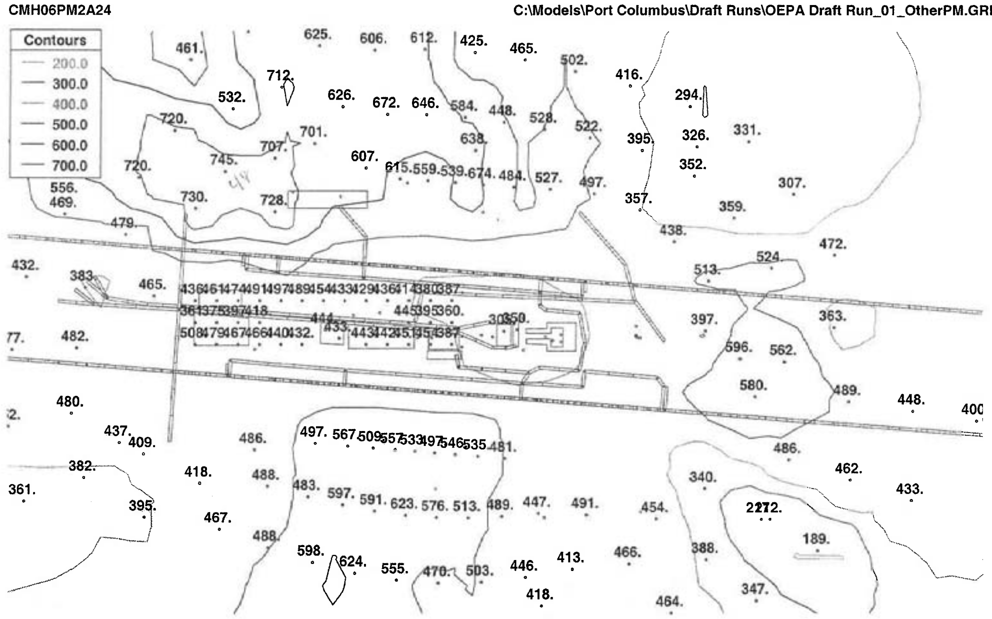

Scale: 1" = 802.1 Meters HIGH 1ST HIGH 8-HR VALUES FOR GROUP: AIRCRAFT Max = 644.25775 (-1120.84, 1266.9)

CMH06PM2A24 C:\BACKUP\MODELS\CMH2a_01_OtherPM.GRF



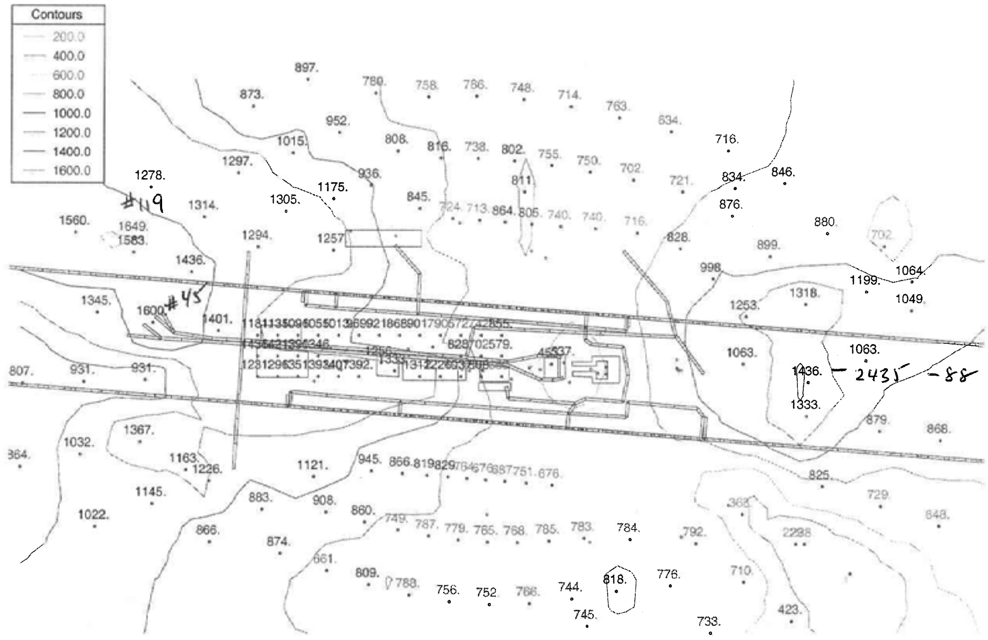

Scale: 1" = 843.7 Meters HIGH 1ST HIGH 3-HR VALUES FOR GROUP: AIRCRAFT Max = 780.80707 (-1687.22, 916.11)

CMH06PM2A24 C:\Models\Port Columbus\Draft Runs\OEPA Draft Run_01_OtherPM.GRF



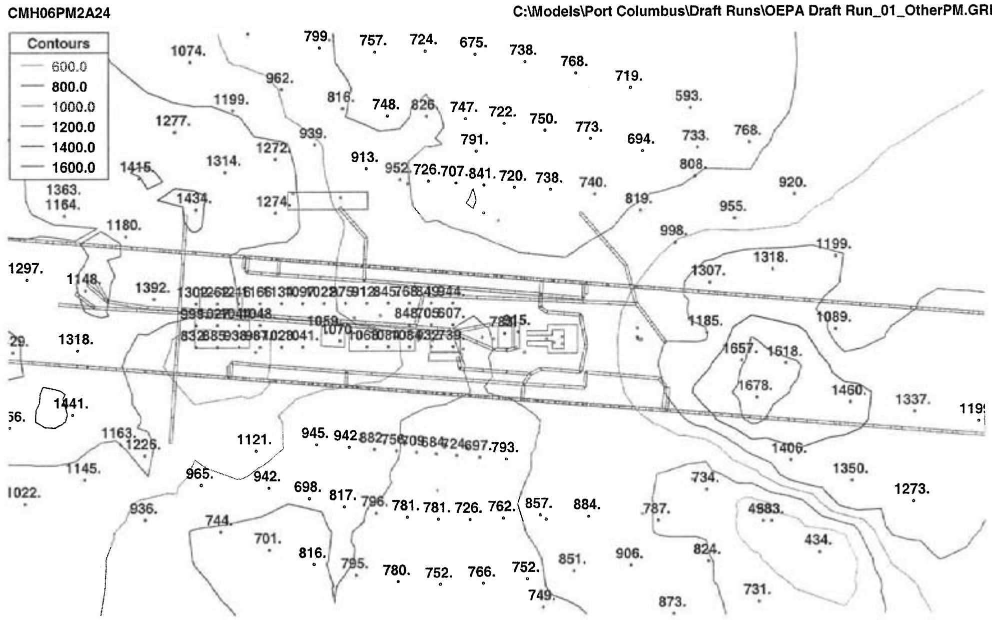

Scale: 1" = 802.1 Meters HIGH 1ST HIGH 3-HR VALUES FOR GROUP: AIRCRAFT Max = 745.17236 (-1478.07, 1175.74)

CMH06PM2A24 C:\BACKUP\MODELS\CMH2a_01_OtherPM.GRF




Scale: 1" = 843.7 Meters HIGH 1ST HIGH 1-HR VALUES FOR GROUP: AIRCRAFT Max = 1649.40454 (-2611.62, 978.07)

**CMH06PM2A24** **C:\Models\Port Columbus\Draft Runs\OEPA Draft Run_01_OtherPM.GRF**




**Scale: 1" = 802.1 Meters** **HIGH 1ST HIGH 1-HR VALUES FOR GROUP: AIRCRAFT** **Max = 1677.99963 (2303.55, -407.43)**

U.S. Department of Transportation
**Federal Aviation Administration**

Detroit Airports District Office
Metro Airport Center
11677 South Wayne Road, Ste. 107
Romulus, MI 48174

September 6, 2007

Mr. Robert F. Hodanbosi, Chief
Division of Air Pollution Control
Ohio Environmental Protection Agency
PO Box 1049
Columbus, OH 43216-1049

Dear Mr. Hodanbosi:

Port Columbus International Airport
Columbus, Ohio
Environmental Impact Statement

The Federal Aviation Administration (FAA) is in receipt of your comment letter and attachment "Specific Comments" dated, August 24, 2007. The FAA appreciates your comments on ways to improve the air quality analysis process for Environmental Impact Statements (EIS) and is taking those comments under review. We have prepared a response to comments for the "Specific Comments." It is attached to this letter.

Based on these comments, the FAA is taking the recommendation of the Ohio Environmental Protection Agency in the location of the additional five receptors that the FAA will evaluate as a part of the Draft EIS.

The FAA will model the following receptors for the Draft EIS.

1. Arrival Curb (FAA)
2. #60 (FAA)
3. #123 (FAA)
4. #118 (FAA)
5. #120 (FAA)
6. #32 (OEPA)
7. Golf course receptor (OEPA)
8. #119 (OEPA)
9. #11 (OEPA)
10. #53 (OEPA)

The FAA looks forward to continuing to work with your staff. If you have any additional questions, please contact Ms. Katherine Jones of my staff at (734) 229-2958.

Sincerely,

Matthew J. Thys
Manager
Detroit Airports District Office

Cc: Sherry Kamke, USEPA
Patricia Morris, USEPA
Rob Adams, L&B
FAA AGL 611.2

## Summary points to answer OEPA comment letter:

- 3hr SO2 should be carried through the modeling process.

The three-hour concentration of SOx will be reported in the EIS for all alternatives, including existing conditions.

--------------------------------------------------------------------------------

- Absent the pollutant specific emission rates to incorporate into our evaluation of candidate receptor locations, we can not recommend alternative receptor locations by pollutant. Since all averaging times can be incorporated into a model run without computational penalties, 1, 3, 8, 24 and annual averaging times would be run.

The dispersion analysis will be conducted to calculate all five averaging periods for emissions of CO, $NO_x$, $SO_x$, $PM_{10}$, and $PM_{2.5}$. However, only the averaging periods for which NAAQS exist will be reported and evaluated in the EIS as follows:

| | |
|---|---|
| CO | 1-hour and 8-hour |
| $NO_x$ | annual |
| $SO_x$ | 3-hour, 24-hour, and annual |
| $PM_{10}$ | 24-hour |
| $PM_{2.5}$ | 24-hour and annual |

The electronic files will contain all the additional data.

--------------------------------------------------------------------------------

- Receptor #11 YMCA Daycare) and receptor #53 (Goshen Lane Elementary School) are to be retained in future analyses. If the FAA believes that it is necessary to retain the noise complaint based receptors, they should be retained.

The FAA had considered both Receptors 11 & 12. FAA initially chose #12 because the receptor is located closer to the emission source at Runway 10L, a methodology suggested in OEPA's comment letter. However, OPEA has requested the consideration of Receptor #11, which is located farther from the source but near a daycare center. FAA will include an evaluation of impacts at Receptor #11, instead of #12 as suggested by OEPA.

Receptor #53 is in close proximity to Receptor #120, which is a receptor location initially selected by FAA. While #53 is near a school, #120 is in the same neighborhood but closer to the emission source and is more likely to pick up changes in emissions from aircraft operating on Runway 10L/28R. Therefore, FAA will include an evaluation of both Receptor #53 and Receptor #120 in the dispersion analysis.

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- Currently, the documentation for the maximum receptor along International Gateway has not been provided. The choice of that receptor and the exclusion of all others should be discussed and documented in the report.

Documentation of the rationale for selecting the receptor at the arrival curb, as well as the four other initial receptor locations, was provided to OEPA, USEPA, CRAA, and MORPC on Monday, August 6, 2007, and was discussed during a teleconference on August 8, 2007. While a representative from MORPC was invited to the conference call, followed up by phone and e-mail, MORPC did not attend the conference call but received a copy of the summary of the meeting minutes. Refer to electronic file, "Comparison for Worst-Case 080607.xls," provided in advance of the meeting for documentation of methodology, procedure, and a summary of the findings indicating the maximum possible concentrations would occur at the arrival curb when compared to the over 100 other receptor locations. This documentation will be included in the EIS as part of the air quality appendix material.

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- An initial set of model based receptors has been identified by FAA/L&B. The process used in the preliminary analyses included assumption on the meteorological conditions under which maximum concentrations would occur. Depending on averaging time, persistence can be as or more important than light winds. In addition, prevailing wind direction may not be as important as the direction of the closest receptor to a given source. It should also be noted that the initial grid which is being reduced is coarse to begin with and appears to be randomly placed. To perform the analysis needed to recommend the receptors which would be carried into subsequent analyses, Ohio EPA added receptors. Given that, Ohio EPA ran several days under all wind conditions and projected the maximum receptor locations for the various averaging times for individual source groups. The following are the receptors that Ohio EPA recommends be added to the previously identified model-based receptors.

The selection of a worst-case meteorological year was not based on an assumption but rather was based on an analytical evaluation of preliminary modeling results using procedures provided by OEPA during the June 19, 2007, scoping meeting. These procedures were presented to OEPA during the conference call conducted August 8, 2007. Refer to electronic file, "Comparison for Worst-Case 080607.xls," which was provided to OEPA prior to the meeting.
The FAA does not consider the grid of airport and community receptors as coarse or randomly placed. As explained in the initial scoping meeting July 19, 2006, the grid was created by establishing a receptor around the perimeter of the airport, along the property line, every 10 degrees, as measured from the Airport Reference Point. A second and third ring of receptors was included to cover the area in Franklin County well beyond the property line. The procedure was detailed in the meeting summary. No comments have been received noting any deficiency in the configuration of the larger receptor grid.

---

- Ohio EPA independently performed two modeling runs using a random selection of days to determine the maximum modeled concentration for each pollutant. The following receptors have been chosen by Ohio EPA to be

evaluated by FAA for the Port Columbus International Airport Environmental Impact Statement. Justification for each chosen receptor is provided.

**1-hour**

Receptor #119 has the highest 1-hour concentration.

The dispersion analysis will include an evaluation of impacts at Receptor #119.

**3-hour**

Receptor #11 has the highest 3-hour concentration. The Franklin County Mental Retardation and Developmental Disabilities facility shares a fenceline with Port Columbus Airport. The YMCA operates an all daycare for young children within the Franklin County MRDD building.

**8-hour**

Receptor #13 has the highest 8-hour concentration. The maximum modeled concentration is slightly higher than the modeled concentration at receptor #11. As a result, Ohio EPA is willing to accept the modeled concentration at receptor #11 as representative of the highest 8-hour concentration. Receptor #13 does not need to be evaluated in the Environmental Impact Statement.

The dispersion analysis will include an evaluation of impacts at Receptor #11, as discussed above.

---

**24-hour**

Receptor #32 has the highest 24-hour concentration. Receptor #32, located on the southern fenceline, will allow Ohio EPA to measure the impact of the project.

Receptor #12 has the highest 24 hour concentration. The maximum modeled concentration is slightly higher than the modeled concentration at receptor #11. As a result, the Ohio EPA is willing to accept the modeled concentration at receptor #11 as representative of the highest 24 hour concentration. Receptor #12 does not need to be evaluated in the Environmental Impact Statement.

**Annual**

Receptor #32 has the highest annual concentration. Ohio EPA considers receptor #32 to be a critical receptor to be evaluated because it has the highest modeled concentration for two averaging periods.

The FAA referred to Receptor #32 in the August 22, 2007, conference call presentation as the location where changes in emissions from the south runway would mostly likely be detected, which is where the major portion of the CMH proposed project would occur. Emissions of three of the five pollutants resulted in high emissions at #32. The dispersion analysis will include an evaluation of impacts at Receptor #32.

**Additional Receptors**

Receptor #53: Ohio EPA has chosen receptor #53 due to its proximity to Goshen Lane Elementary School. Although Goshen Lane Elementary may not voice noise complaints, the students are considered sensitive receptors.

Receptor (2303.55,-407.43): A receptor shall be placed on the airport golf course due to public access. The airport golf course is considered ambient air, therefore shall be evaluated.

The analysis will also include an evaluation of impacts at Receptor #53, as discussed previously.

Although the golf course is located within the airport property line, the course is within an area considered to be ambient air. Therefore, the dispersion analysis will include an evaluation of impacts at a receptor placed at 2303.55,-407.43 meters, located within the golf course, as suggested by OEPA.

The full set of receptors that will be evaluated in the EIS include:

1 - Arrival curb
2 - #60
3. - #123
4. - #118
5. - #120
6. - #32
7. - Golf course receptor
8. - #119
9. - #11
10. - #53

# ATTACHMENT 3
# EDMS FILES BY ALTERNATIVE

The air quality analysis required extensive computer modeling using the FAA Emissions and Dispersion Modeling System (EDMS). There are many files associated with the several scenarios run in EDMS and some of the files would be hundreds of pages long to print into this attachment. Therefore, the electronic files for each scenario are available upon request. Please contact Katherine Jones at katherine.s.jones@faa.gov or at (734) 229-2958.

# ATTACHMENT 4
# EDMS INVENTORY OUTPUT FILES BY ALTERNATIVE

The air quality analysis using the FAA Emissions and Dispersion Modeling System allows for printout of the inventory summary without including all the input data. The complete input data files are available electronically (see Attachment 3). This attachment includes the printouts of the inventory summary of each EDMS scenario included in the air quality assessment.

# Emissions Inventory Summary

(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 673.776 | 57.157 | 57.157 | 61.057 | 277.130 | 24.808 | 3.471 | 3.471 |
| GSE/APU | 945.092 | 40.517 | 36.910 | 38.455 | 70.540 | 8.833 | 3.086 | 2.986 |
| Roadways | 634.687 | 54.968 | 52.653 | 55.596 | 84.989 | 0.403 | 2.296 | 1.563 |
| Parking Facilities | 111.964 | 15.970 | 15.268 | 17.442 | 14.161 | 0.056 | 0.319 | 0.219 |
| Stationary Sources | 21.449 | 12.112 | 11.582 | 13.259 | 35.756 | 16.637 | 2.489 | 2.205 |
| Total | 2,386.967 | 180.724 | 173.570 | 185.809 | 482.576 | 50.737 | 11.661 | 10.444 |

*** PM data for some aircraft in the study is unavailable.

| Aircraft | Engine | Mode | CO | THC | NM... | VOC | NOx | SOx | PM... | PM-... | Fuel Cons... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Takeoff | 0.025 | 0.003 | 0.003 | 0.003 | 0.578 | 0.031 | 0.003 | 0.003 | 31.291 |
| | | Idle | 1.497 | 0.211 | 0.211 | 0.224 | 0.129 | 0.035 | 0.003 | 0.003 | 35.379 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary

## (Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 741.344 | 61.769 | 61.769 | 65.941 | 300.943 | 27.101 | 3.715 | 3.715 |
| GSE/APU | 1,097.090 | 45.668 | 41.511 | 43.219 | 69.387 | 9.270 | 3.142 | 3.034 |
| Roadways | 690.992 | 41.514 | 39.461 | 48.419 | 68.030 | 0.530 | 2.216 | 1.293 |
| Parking Facilities | 170.878 | 11.263 | 10.623 | 25.326 | 22.179 | 0.084 | 0.349 | 0.203 |
| Stationary Sources | 21.450 | 12.421 | 11.891 | 14.114 | 35.756 | 16.638 | 2.490 | 2.205 |
| Total | 2,721.753 | 172.635 | 165.254 | 197.019 | 496.295 | 53.624 | 11.912 | 10.449 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary
## (Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 765.835 | 63.560 | 63.560 | 67.841 | 309.041 | 27.914 | 3.805 | 3.805 |
| GSE/APU | 1,111.583 | 46.313 | 42.103 | 43.828 | 70.859 | 9.502 | 3.196 | 3.090 |
| Roadways | 690.992 | 41.514 | 39.461 | 48.419 | 68.030 | 0.530 | 2.216 | 1.293 |
| Parking Facilities | 170.878 | 11.263 | 10.623 | 25.326 | 22.179 | 0.084 | 0.349 | 0.203 |
| Stationary Sources | 21.450 | 12.421 | 11.891 | 14.114 | 35.756 | 16.638 | 2.490 | 2.205 |
| Total | 2,760.738 | 175.071 | 167.637 | 199.527 | 505.864 | 54.668 | 12.056 | 10.595 |

*** PM data for some aircraft in the study is unavailable.

| Name | Type | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|---|
| To Red 2 | Roadway | 1.475 | 0.097 | 0.093 | 0.114 | 0.150 | 0.001 | 0.006 | 0.003 |
| To Red 3 | Roadway | 0.682 | 0.045 | 0.043 | 0.053 | 0.069 | 0.001 | 0.002 | 0.001 |
| Red | Parking | 23.057 | 1.486 | 1.400 | 3.269 | 3.057 | 0.011 | 0.049 | 0.029 |
| Lane Avtn | Parking | 4.688 | 0.322 | 0.304 | 0.750 | 0.584 | 0.002 | 0.009 | 0.006 |
| Blue | Parking | 39.259 | 2.533 | 2.388 | 5.582 | 5.199 | 0.020 | 0.083 | 0.047 |
| Green | Parking | 8.750 | 0.613 | 0.580 | 1.455 | 1.066 | 0.004 | 0.017 | 0.010 |
| Employee Parking | Parking | 13.297 | 0.886 | 0.836 | 2.012 | 1.709 | 0.007 | 0.026 | 0.015 |
| ShortTerm Pkg Lvl 4 | Parking | 5.293 | 0.371 | 0.352 | 0.884 | 0.644 | 0.002 | 0.010 | 0.006 |
| Long Term Pkg Lvl 1 | Parking | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Long Term Pkg Lvl 3 | Parking | 13.690 | 0.946 | 0.893 | 2.216 | 1.695 | 0.007 | 0.026 | 0.015 |
| ShortTerm Pkg Lvl 5 | Parking | 5.293 | 0.371 | 0.352 | 0.884 | 0.644 | 0.002 | 0.010 | 0.006 |
| Long Term Pkg Lvl 4 | Parking | 6.800 | 0.470 | 0.443 | 1.101 | 0.842 | 0.003 | 0.013 | 0.008 |
| Long Term Pkg Lvl 5 | Parking | 14.003 | 0.968 | 0.914 | 2.266 | 1.734 | 0.007 | 0.026 | 0.015 |
| Long Term Pkg Lvl 2 | Parking | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| New RAC | Parking | 36.748 | 2.297 | 2.163 | 4.906 | 5.006 | 0.019 | 0.080 | 0.046 |

# Emissions Inventory Summary

## (Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 824.262 | 68.397 | 68.397 | 72.981 | 324.531 | 29.633 | 3.831 | 3.831 |
| GSE/APU | 1,279.948 | 52.519 | 47.674 | 49.598 | 73.790 | 10.597 | 3.909 | 3.781 |
| Roadways | 690.992 | 41.514 | 39.461 | 48.419 | 68.030 | 0.530 | 2.216 | 1.293 |
| Parking Facilities | 170.878 | 11.263 | 10.623 | 25.326 | 22.179 | 0.084 | 0.349 | 0.203 |
| Stationary Sources | 21.450 | 12.421 | 11.891 | 14.114 | 35.756 | 16.638 | 2.490 | 2.205 |
| Total | 2,987.529 | 186.114 | 178.045 | 210.438 | 524.286 | 57.482 | 12.795 | 11.312 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary
(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 828.477 | 68.950 | 68.950 | 73.577 | 324.847 | 29.721 | 3.837 | 3.837 |
| GSE/APU | 1,280.027 | 52.504 | 47.671 | 49.601 | 73.798 | 10.617 | 3.907 | 3.774 |
| Roadways | 690.992 | 41.514 | 39.461 | 48.419 | 68.030 | 0.530 | 2.216 | 1.293 |
| Parking Facilities | 170.878 | 11.263 | 10.623 | 25.326 | 22.179 | 0.084 | 0.349 | 0.203 |
| Stationary Sources | 21.450 | 12.421 | 11.891 | 14.114 | 35.756 | 16.638 | 2.490 | 2.205 |
| Total | 2,991.824 | 186.652 | 178.594 | 211.036 | 524.609 | 57.590 | 12.799 | 11.312 |

*** PM data for some aircraft in the study is unavailable.

| Name | Type | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|---|
| To Red 2 | Roadway | 1.475 | 0.097 | 0.093 | 0.114 | 0.150 | 0.001 | 0.006 | 0.003 |
| To Red 3 | Roadway | 0.682 | 0.045 | 0.043 | 0.053 | 0.069 | 0.001 | 0.002 | 0.001 |
| Blue | Parking | 39.259 | 2.533 | 2.388 | 5.582 | 5.199 | 0.020 | 0.083 | 0.047 |
| Employee Parking | Parking | 13.297 | 0.886 | 0.836 | 2.012 | 1.709 | 0.007 | 0.026 | 0.015 |
| Green | Parking | 8.750 | 0.613 | 0.580 | 1.455 | 1.066 | 0.004 | 0.017 | 0.010 |
| Lane Avtn | Parking | 4.688 | 0.322 | 0.304 | 0.750 | 0.584 | 0.002 | 0.009 | 0.006 |
| Long Term Pkg Lvl 1 | Parking | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Long Term Pkg Lvl 2 | Parking | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Long Term Pkg Lvl 3 | Parking | 13.690 | 0.946 | 0.893 | 2.216 | 1.695 | 0.007 | 0.026 | 0.015 |
| Long Term Pkg Lvl 4 | Parking | 6.800 | 0.470 | 0.443 | 1.101 | 0.842 | 0.003 | 0.013 | 0.008 |
| Long Term Pkg Lvl 5 | Parking | 14.003 | 0.968 | 0.914 | 2.266 | 1.734 | 0.007 | 0.026 | 0.015 |
| New RAC | Parking | 36.748 | 2.297 | 2.163 | 4.906 | 5.006 | 0.019 | 0.080 | 0.046 |
| Red | Parking | 23.057 | 1.486 | 1.400 | 3.269 | 3.057 | 0.011 | 0.049 | 0.029 |
| ShortTerm Pkg Lvl 4 | Parking | 5.293 | 0.371 | 0.352 | 0.884 | 0.644 | 0.002 | 0.010 | 0.006 |
| ShortTerm Pkg Lvl 5 | Parking | 5.293 | 0.371 | 0.352 | 0.884 | 0.644 | 0.002 | 0.010 | 0.006 |

# Emissions Inventory Summary

(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 821.289 | 67.647 | 67.647 | 72.177 | 324.638 | 29.583 | 3.824 | 3.824 |
| GSE/APU | 1,279.948 | 52.519 | 47.674 | 49.598 | 73.790 | 10.597 | 3.909 | 3.781 |
| Roadways | 690.992 | 41.514 | 39.461 | 48.419 | 68.030 | 0.530 | 2.216 | 1.293 |
| Parking Facilities | 170.878 | 11.263 | 10.623 | 25.326 | 22.179 | 0.084 | 0.349 | 0.203 |
| Stationary Sources | 21.450 | 12.421 | 11.891 | 14.114 | 35.756 | 16.638 | 2.490 | 2.205 |
| Total | 2,984.556 | 185.364 | 177.295 | 209.634 | 524.393 | 57.432 | 12.788 | 11.305 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary

(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 825.930 | 68.616 | 68.616 | 73.212 | 324.644 | 29.665 | 3.831 | 3.831 |
| GSE/APU | 1,280.027 | 52.504 | 47.671 | 49.601 | 73.798 | 10.617 | 3.907 | 3.774 |
| Roadways | 690.992 | 41.514 | 39.461 | 48.419 | 68.030 | 0.530 | 2.216 | 1.293 |
| Parking Facilities | 170.878 | 11.263 | 10.623 | 25.326 | 22.179 | 0.084 | 0.349 | 0.203 |
| Stationary Sources | 21.450 | 12.421 | 11.891 | 14.114 | 35.756 | 16.638 | 2.490 | 2.205 |
| Total | 2,989.276 | 186.318 | 178.260 | 210.672 | 524.406 | 57.535 | 12.792 | 11.305 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary
## (Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 812.855 | 66.887 | 66.887 | 71.366 | 323.639 | 29.401 | 3.803 | 3.803 |
| GSE/APU | 1,279.880 | 52.511 | 47.669 | 49.607 | 73.791 | 10.616 | 3.905 | 3.773 |
| Roadways | 690.992 | 41.514 | 39.461 | 48.419 | 68.030 | 0.530 | 2.216 | 1.293 |
| Parking Facilities | 170.878 | 11.263 | 10.623 | 25.326 | 22.179 | 0.084 | 0.349 | 0.203 |
| Stationary Sources | 21.450 | 12.421 | 11.891 | 14.114 | 35.756 | 16.638 | 2.490 | 2.205 |
| Total | 2,976.055 | 184.596 | 176.531 | 208.832 | 523.394 | 57.269 | 12.764 | 11.277 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary

(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 854.669 | 71.381 | 71.381 | 76.137 | 379.086 | 34.483 | 3.856 | 3.856 |
| GSE/APU | 1,491.122 | 60.328 | 54.719 | 56.907 | 80.004 | 12.165 | 5.013 | 4.841 |
| Roadways | 653.003 | 35.180 | 33.352 | 36.434 | 42.159 | 0.613 | 2.026 | 1.012 |
| Parking Facilities | 218.551 | 10.552 | 9.913 | 32.385 | 28.370 | 0.107 | 0.358 | 0.179 |
| Stationary Sources | 21.453 | 12.612 | 12.081 | 14.665 | 35.757 | 16.638 | 2.492 | 2.205 |
| Total | 3,238.798 | 190.054 | 181.446 | 216.527 | 565.375 | 64.006 | 13.746 | 12.092 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary
(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 857.923 | 71.790 | 71.790 | 76.582 | 379.408 | 34.543 | 3.872 | 3.872 |
| GSE/APU | 1,491.067 | 60.316 | 54.702 | 56.910 | 79.985 | 12.164 | 5.008 | 4.848 |
| Roadways | 653.003 | 35.180 | 33.352 | 36.434 | 42.159 | 0.613 | 2.026 | 1.012 |
| Parking Facilities | 218.551 | 10.552 | 9.913 | 32.385 | 28.370 | 0.107 | 0.358 | 0.179 |
| Stationary Sources | 21.453 | 12.612 | 12.081 | 14.665 | 35.757 | 16.638 | 2.492 | 2.205 |
| Total | 3,241.997 | 190.451 | 181.838 | 216.976 | 565.679 | 64.065 | 13.757 | 12.116 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary

(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 850.995 | 70.917 | 70.917 | 75.656 | 378.760 | 34.409 | 3.849 | 3.849 |
| GSE/APU | 1,491.122 | 60.328 | 54.719 | 56.907 | 80.004 | 12.165 | 5.013 | 4.841 |
| Roadways | 653.003 | 35.180 | 33.352 | 36.434 | 42.159 | 0.613 | 2.026 | 1.012 |
| Parking Facilities | 218.551 | 10.552 | 9.913 | 32.385 | 28.370 | 0.107 | 0.358 | 0.179 |
| Stationary Sources | 21.453 | 12.612 | 12.081 | 14.665 | 35.757 | 16.638 | 2.492 | 2.205 |
| Total | 3,235.124 | 189.590 | 180.982 | 216.046 | 565.049 | 63.932 | 13.739 | 12.086 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary

(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 854.252 | 71.333 | 71.333 | 76.095 | 379.083 | 34.475 | 3.861 | 3.861 |
| GSE/APU | 1,491.067 | 60.316 | 54.702 | 56.910 | 79.985 | 12.164 | 5.008 | 4.848 |
| Roadways | 653.003 | 35.180 | 33.352 | 36.434 | 42.159 | 0.613 | 2.026 | 1.012 |
| Parking Facilities | 218.551 | 10.552 | 9.913 | 32.385 | 28.370 | 0.107 | 0.358 | 0.179 |
| Stationary Sources | 21.453 | 12.612 | 12.081 | 14.665 | 35.757 | 16.638 | 2.492 | 2.205 |
| Total | 3,238.325 | 189.993 | 181.381 | 216.488 | 565.353 | 63.997 | 13.746 | 12.104 |

*** PM data for some aircraft in the study is unavailable.

# Emissions Inventory Summary

(Short Tons/Year)

| Category | CO | THC | NMHC | VOC | NOx | SOx | PM-10 | PM-2.5 |
|---|---|---|---|---|---|---|---|---|
| Aircraft | 835.893 | 69.031 | 69.031 | 73.642 | 377.423 | 34.079 | 3.818 | 3.818 |
| GSE/APU | 1,491.133 | 60.333 | 54.724 | 56.927 | 79.989 | 12.154 | 5.013 | 4.834 |
| Roadways | 673.182 | 35.188 | 33.375 | 36.020 | 43.411 | 0.625 | 2.065 | 1.032 |
| Parking Facilities | 212.172 | 10.776 | 10.126 | 30.155 | 26.253 | 0.110 | 0.368 | 0.182 |
| Stationary Sources | 21.453 | 12.612 | 12.081 | 14.665 | 35.757 | 16.638 | 2.492 | 2.205 |
| Total | 3,233.832 | 187.940 | 179.337 | 211.409 | 562.832 | 63.607 | 13.757 | 12.070 |

*** PM data for some aircraft in the study is unavailable.

# ATTACHMENT 5
# ON-SITE GSE SURVEY SUMMARY AND STATIONARY SOURCE SURVEY SUMMARY

An on-site inventory of GSE and stationary sources of emissions was conducted in July 2006. Reports describing the methodology and results of the surveys are included in this attachment.

**MEMORANDUM**

TO: Virginia Raps — Landrum and Brown, Inc.

FROM: Jill Foster — Gresham, Smith and Partners

DATE: July 21, 2006

**SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
PORT COLUMBUS INTERNATIONAL AIRPORT
MOBILE SOURCE EMISSION SURVEY SUMMARY REPORT
COLUMBUS, OHIO**
GS&P Project No. 25112.01

Preparation of the Environmental Impact Statement (EIS) for the Port Columbus International Airport (PCIA) requires consideration of potential air quality issues associated with the proposed development projects. A survey of mobile air emissions sources at PCIA was conducted on July 13, 2006. The survey crew consisted of one representative from Landrum and Brown, Inc. and one representative from Gresham, Smith and Partners (the Team). This survey was conducted in order to determine fuel type, number of units, and the time spent in operating mode for each mobile source while aircraft were parked at the terminal gates. The data was collected from a pre-determined set of aircraft, airline operators, and concourses. In addition, the Team completed data forms using information provided by the appropriate airport personnel and information collected during the Team's visual inspection.

The following information relates to the equipment the Team visually inspected:

Each gate was visually inspected for the availability of 400 MHz ground power units (GPU), preconditioned air, and potable water taps.


**400 MHz GPU attached to plane**


**Preconditioned air gate service**


**Potable water source at gate service**

**Ground Support Vehicles**

Aircraft tractors are used for towing aircraft into the terminal gate area and/or pushing the aircraft onto the tarmac. They are also used for towing aircraft to and from hangars for maintenance.

**Aircraft Tractor**

Baggage tractors are a diverse set of highly maneuverable vehicles used primarily to pull dolly trains between the terminal and the aircraft. They are also used for general transport around the ramp area.


**Baggage Tractor**

Belt loaders are versatile, self-propelled conveyor belts with hydraulic systems that adjust the belt angle and belt height. Although some of the newer models can operate the conveyor belt system with out the engines running, most need to have the engines running in order to operate the hydraulic systems. Belt loaders are used for loading and unloading small cargo and passenger luggage from the lower storage compartment of the aircraft.

**Belt Loader**

Catering trucks are capable of hydraulically lifting its payload to the elevation of the aircraft door. Typically, the vehicle is left running while servicing the aircraft. The service time for these vehicles vary by the need for meals.


**Catering Truck**

Fuel trucks are mobile tanks with fuel that drive to refill the aircraft directly from the tank. The mobile tanks are used to refuel the general aviation aircraft that do not gate near an underground fuel supply. Since the pump on the truck needs to be powered by the vehicle's engine, the truck is left running during the entire refueling operation.


**Fuel Truck**

Lavatory trucks are equipped with pumps to extract discharge from the aircraft lavatory tank, as well as, pump a fresh supply of antiseptic fluid back into the aircraft. Waste is then transported for discharged into a sewage system on the premises. Lavatory services are not needed for each leg of a flight, and therefore do not service every flight. When lavatory service is needed, the number of lavatories onboard the aircraft will determine the time it takes to service the aircraft. Since the pumps on the truck need to be powered by the vehicle's engine, the truck is left running during service.


**Lavatory Truck**

To avoid congestion at the gate and interference with passengers and cabin crew, cabin service trucks are employed to transport airline personnel and cleaning supplies to the rear hatches of aircraft. These trucks are often equipped with a hydraulic lift to access elevated aircraft ports. Cabin service trucks may also transport trash from the aircraft to garbage receptacles located elsewhere in the airport.


**Cabin Service Truck**

The following report is a summary of the areas visited and mobile equipment identified by the Team during the mobile source tour:

**8:00 am**

At 7:45 am the Team proceeded to gate B18, Midwest Airlines Flight 2053 where the Team awaited the aircraft (Dornier 328 Jet) arrival. The Team identified that there was electricity and potable water available at the gate. Preconditioned air was not available. Once the aircraft arrived, one gasoline baggage tractor and one diesel belt loader were used to assist with baggage loading and unloading. The gasoline baggage tractor operated for approximately 8 minutes and the diesel belt loader operated for approximately 22 minutes. Also, one diesel aircraft tractor was available and used to pushback the aircraft during departure. The aircraft tractor operated for approximately 5 minutes. One diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 13 minutes. The aircraft did not use the potable water at the gate. The aircraft did not use the electricity at the gate. Its auxiliary power unit (APU) was operating for approximately 28 minutes.

**Dornier 328 Jet**

**8:42 am**

After the data was recorded for Flight 2053, the Team proceeded to gate A6, Continental Airlines Flight 2929 where the Team awaited the aircraft (Regional Jet, ERJ) arrival. The Team noted the time and observed that the ground crew was not preparing for Flight 2929's arrival. After the Team asked the ground crew about Flight 2929's status, they informed the Team that flight was delayed and that it was expected to arrive at 9:12 am. The Team decided to skip Flight 2929 and proceed to the next scheduled arrival.

**9:31 am**

At 9:20 am the Team proceeded to gate B24, US Airways Flight 4931 where the Team awaited the aircraft (Saab SF 340) arrival. The Team identified that there was electricity at the gate. Preconditioned air and potable water were not available. Once the aircraft arrived, three diesel baggage tractors and one diesel belt loader were used to assist with baggage loading and unloading. The baggage tractors operated for approximately 8 minutes and the belt loader operated for approximately 25 minutes. In addition, one diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 14 minutes. The aircraft did not use the electricity at the gate. Its APU was operating for approximately 33 minutes. Ground crew personnel informed the Team that air conditioning carts are available at the pilot's request. The air conditioning carts were not used during this turn.


**Saab SF 340**

When the Team was at gate B24, it was noted that another aircraft (Regional Jet) was going to arrive at gate B22. Therefore, the Team decided to add this flight to the schedule to compensate for the previously cancelled flight. US Airways Flight 3053 arrived at gate B22. The Team identified that there was electricity at the gate.

Preconditioned air and potable water were not available. Once the aircraft arrived, one gasoline baggage tractor, three diesel baggage tractors, and one diesel belt loader were used to assist with baggage loading and unloading. The gasoline baggage tractor operated for approximately 26 minutes, the diesel baggage tractors operated for approximately 12 minutes, and the belt loader operated for approximately 28 minutes. One diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 7 minutes. The aircraft did not use the electricity at the gate.  Its APU was operating for approximately 33 minutes.


**Regional Jet**

**10:12 am**

After the data was recorded for both Flight 4931 and Flight 3053, the Team proceeded to gate B30 for Air Canada Flight 7890 where the Team awaited the aircraft's (Dash 8) arrival. The Team identified that there was preconditioned air, electricity, and potable water at the gate. Once the aircraft arrived, three gasoline baggage tractors and one gasoline belt loader were used to assist with baggage loading and unloading. The baggage tractors operated for approximately 42 minutes and the belt loader operated for approximately 21 minutes. A ground power unit (GPU) was also operating at the gate for approximately 30 minutes. In addition, one diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 10 minutes. The aircraft did not use the preconditioned air or potable water at the gate. The aircraft did not use electricity at the gate.  Its APU was operating for approximately 32 minutes.


**Dash 8**

**11:10 am**

After the data was recorded for Flight 7890, the Team proceeded to gate B22, US Airways Flight 394 where the Team awaited the aircraft (737-300) arrival. The Team identified that there was electricity at the gate. Preconditioned air and potable water were not available. Once the aircraft arrived, three diesel baggage tractors, one gasoline belt loader, and one diesel belt loader were used to assist with baggage loading and unloading. The diesel baggage tractors operated for approximately 17 minutes, the gasoline belt loader operated for approximately 22 minutes, and the diesel belt loader operated for approximately 21 minutes. Also, one diesel aircraft tractor was available and used to pushback the aircraft during departure. The aircraft tractor operated for approximately 21 minutes. In addition, one diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 20 minutes. The aircraft was at the gate for approximately 36 minutes, and used the provided electricity. The APU operated for approximately 3 minutes. Dave Wall, a Columbus Regional Airport Authority representative, provided information that a gasoline catering truck (Gate Gourmet) usually provided its services for larger aircraft such as the 737 and typically operated for approximately 15 minutes. The catering truck was not used during the data collection.


**737-300**

**2:01 pm**

The Team proceeded to gate B18 for Midwest Airlines Flight 1512 where the Team awaited the aircraft (Beech 1900) arrival. The Team identified that there was electricity at the gate. Preconditioned air and potable water were not available. Once the aircraft arrived, one diesel baggage tractor was used to assist with baggage loading and unloading. The baggage tractor operated for approximately 2 minutes. In addition, one diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 18 minutes. The APU operated for approximately 27 minutes. The ground crew provided information that a diesel GPU was usually used at this gate and typically operated for approximately 10 minutes. The GPU was not used during the data collection.

**Beech 1900**

**2:44 pm**

After the data was recorded for Flight 1512, the Team proceeded to gate B22, US Airways Flight 3117, where the Team awaited the aircraft (Regional Jet, ERJ) arrival. The Team identified that there was electricity at the gate. Preconditioned air and potable water were not available. Once the aircraft arrived, three gasoline baggage tractors, one diesel baggage tractor, one gasoline belt loader, and one diesel belt loader were used to assist with baggage loading and unloading. The gasoline baggage tractors operated for approximately 22 minutes, the diesel baggage tractor operated for approximately 38 minutes, the gasoline belt loader operated for approximately 23 minutes, and the diesel belt loader operated for approximately 42 minutes. Also, one diesel aircraft tractor was available and used to pushback the aircraft during departure. The aircraft tractor operated for approximately 9 minutes. One diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 11 minutes. The aircraft did not use electricity at the gate. The APU operated for approximately 49 minutes.


**Regional Jet, ERJ**

**3:35 pm**

After the data was recorded for Flight 3117, the Team proceeded to gate C56, Delta Flight 720 where the Team awaited the aircraft (MD88) arrival. The Team identified that there was preconditioned air and electricity at the gate. Potable water was not available. The aircraft was expected to arrive at 3:35 pm but actually arrived at 4:15 pm. Once the aircraft arrived, seven diesel baggage tractors and two diesel belt loaders were used to assist with baggage loading and unloading. The diesel baggage tractors operated for approximately 42 minutes and the diesel belt loader operated for approximately 46 minutes. Also, one diesel aircraft tractor was available and used to pushback the aircraft during departure. The aircraft tractor operated for approximately 20 minutes. One diesel fuel truck, owned and operated by Lane Aviation, refueled the aircraft. The fuel truck operated for approximately 18 minutes. The aircraft did use the preconditioned air at the gate. The aircraft appeared to use electricity at the gate; however, it was determined that the APU was also operating. The APU operated for approximately 46 minutes. Dave Wall, a Columbus Regional Airport Authority representative, provided information that a gasoline catering truck (Gate Gourmet) usually provided its services for larger aircraft such as the 737 and typically operated for approximately 15 minutes. The catering truck was not used during the data collection.


**MD 88**

Questions regarding information from the mobile source emission survey may be directed to:

Jill Foster
Gresham, Smith and Partners
580 North 4th Street, Suite 230
Columbus, Ohio 43215
tel: 614-221-0678
fax: 614-221-7329

JF

Copy Virginia Raps - Landrum and Brown, Inc.

GRESHAM
SMITH AND
PARTNERS

**MEMORANDUM**

TO: Virginia Raps — Landrum and Brown, Inc.

FROM: Jill Foster — Gresham, Smith and Partners

DATE: July 21, 2006

**SUBJECT: ENVIRONMENTAL IMPACT STATEMENT**
**PORT COLUMBUS INTERNATIONAL AIRPORT**
**STATIONARY SOURCE EMISSION SURVEY SUMMARY REPORT**
GS&P Project No. 25112.01

Preparation of the Environmental Impact Statement (EIS) for the Port Columbus International Airport (PCIA) requires consideration of potential air quality issues associated with the proposed development projects. A survey of stationary air emissions sources at PCIA was conducted on July 12, 2006. The survey crew consisted of one representative from Landrum and Brown, Inc. and one representative from Gresham, Smith and Partners (the Team). This survey was conducted in order to augment data from a previous stationary source tour conducted by Environmental Quality Management, Inc. and Gresham, Smith and Partners in 2004[i] . The Team completed data forms using information provided by the appropriate airport personnel and information collected during the Team's visual inspection.

The following report is a summary of the areas visited by the Team during the stationary tour:

## Glycol Farm

The Team was escorted by Dave Wall, a representative from the Columbus Regional Airport Authority (CRAA). The Team was driven to the glycol farm where most of the deicing fluids are stored. The deicing fluids are contained within tanks that are either privately owned by individual airlines or owned by CRAA. These tanks consist of Propylene Glycol and Potassium Acetate. The deicing fluid is dispersed using trucks that spray the fluid on the aircraft. There were approximately nine diesel engine trucks parked at the glycol farm that were owned by various airlines.


**Glycol Tank**

**Trucks Owned By Airlines Which Distribute Glycol**

**<u>Airport Rescue and Fire Fighting (ARFF)</u>**

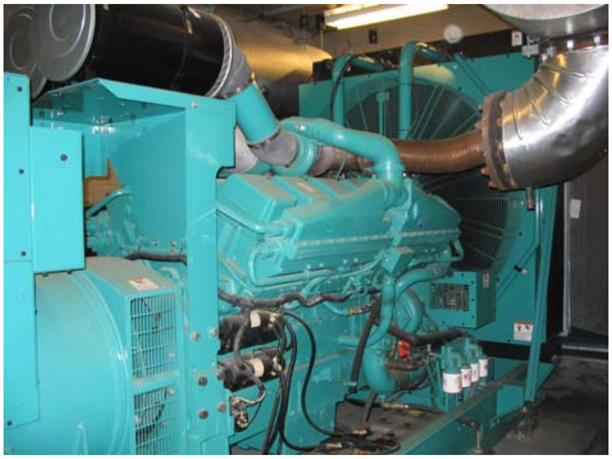
The Team was then escorted to the ARFF located near the glycol farm. The Team was introduced to the ARFF Chief, Allen Ward. The Team spoke with Mr. Ward regarding the ARFF facilities, equipment, and general information. Mr. Ward gave detailed descriptions regarding the trucks that are used by ARFF. There are two fire trucks, one Titan 1,500 gallon water truck and one Oshkosh 3,000 gallon water truck, a Ford 550 used as a rescue truck, and a Ford 350 used as a staff truck. All of these trucks carry water (300 to 3000 gallons) and ARFF foam (200 to 400 gallons), while two trucks also carry a dry chemical, Purple K (500 lbs). There are also Ford 350 trucks that are used as ambulances. All the trucks run on diesel fuel. Mr. Wall and Mr. Ward then escorted the Team to an emergency generator located at the facility and provided information of its use.

**Titan Fire Truck**

**Boilers and Emergency Generators**

The Team was escorted back to the Airport Administrative offices where they were introduced to Denny Finch, Manager of Facilities, and Jim Iles, Manager of Building Maintenance. The team was then escorted by Mr. Iles to view the boilers and emergency generators located below Concourses A, B, and C, and the equipment located within the parking garage. Mr. Iles provided information regarding each boiler and generator and allowed the Team to write down information located on placards affixed on the equipment.

**Boilers Located Below Concourse B**

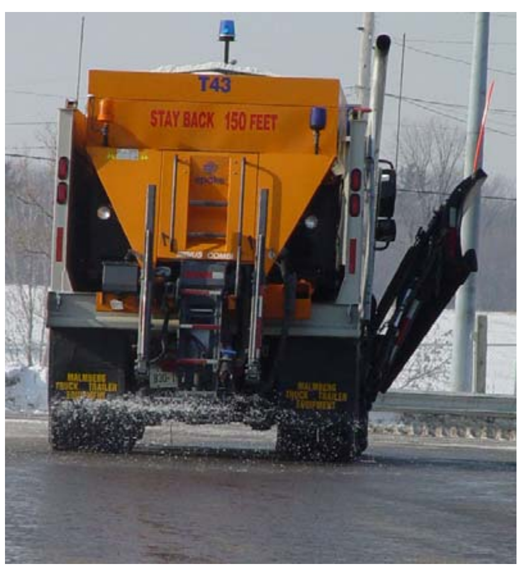


**Emergency Generator located in the Parking Garage**

**<u>Airport Maintenance Facility</u>**

The Team was escorted back to the Airport Administrative Offices and introduced to Larry Heistand, Supervisor of Facilities. Mr. Heistand escorted the Team to the Airfield Maintenance offices where they were introduced to John Bumgartner, Fleet Maintenance Supervisor. Mr. Heistand and Mr. Bumgartner escorted the Team around the Airfield Maintenance Facility where the Team was informed about the Fuel Island and sand/salt piles.

Mr. Bumgartner informed the Team that there were three underground storage tanks, one 10,000 gallon diesel tank and two 20,000 gallon gasoline tanks. Mr. Bumgartner stated that the tanks are used to fuel CRAA equipment and vehicles and that the soil has been checked for tank leakage. Mr. Baumgartner then escorted the Team to the sand/salt piles, which were located within enclosed buildings. Trucks equipped with shovels take the sand/salt out of the buildings.  The sand/salt is then placed in vehicles that distribute the materials on the airport's paved surfaces as needed for deicing and traction. Mr. Baumgartner indicated that the location stores 600 tons of salt and 800 tons of sand. The stored sand is used for runways and the stored salt is used for roads. He also stated that 150 tons of sodium acetate is stored for the parking garage and 150 tons of sodium formate is stored for the ramp, concrete surfaces, and access roads. He also indicated that potassium formate, which is used as an anti-icer on paved surfaces is contained within storage tanks at the Airfield Maintenance facility and at the Glycol Farm. The potassium formate is contained within two storage tanks at the Airfield Maintenance facility, one 20,000 gallon AST and one 10,000 gallon UST, as well as within one 10,000 gallon AST at the Glycol Farm.




**Salt Truck Distributing Salt**

**<u>Incinerator</u>**

The Team was then escorted by Mr. Heistand to the incinerator located at the Glycol Farm. Mr. Heistand allowed the Team to gather information provided on the incinerator exterior. He informed the Team that the incinerator is used by custodial personnel to burn aircraft waste and is used by the Airport Police to burn illegal narcotics.

**Incinerator Located at the Glycol Farm**

Questions regarding information from the mobile source emission survey may be directed to:

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Gresham, Smith and Partners
580 North 4th Street, Suite 230
Columbus, Ohio 43215
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fax: 614-221-7329

Copy Virginia Raps - Landrum and Brown, Inc.

[i] Potential Air Emission Inventory for The Port Columbus International Airport, Columbus, Ohio. 2004. Environmental Quality Management, Inc. and Gresham, Smith and Partners.

# ATTACHMENT 6
# CONSTRUCTION EMISSIONS INVENTORY TABLES

Construction emissions were calculated for 20 separate project tasks, depending on the build-out year. The four spreadsheets provided in this attachment show the total emissions for each calendar year for each project alternative, including the 2012 Accelerated Sponsor's Proposed Project.

**Construction Emissions Page 1**
**Port Columbus International Airport**

| Year | Phase | No. | Project | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2012 | C2 | 1 | Expansion Glycol Storage Facility/Wastewater Detention | | X | X | | | | | | | | |
| 2012 | C2 | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | X | X | | | | | | | | |
| 2012 | C2 | 3 | Replacement Runway | | X | X | X | X | | | | | | |
| 2012 | C2 | 4 | Construct Additional Taxiways | | X | X | X | X | | | | | | |
| 2012 | C2 | 5 | Realignment of Stelzer Road | | X | X | | | | | | | | |
| 2012 | C2 | 6 | Remove Portions of Columbus International Aircenter, including Control Tower Building #7 | | X | X | | | | | | | | |
| 2012 | C2 | 7 | Demolish Two Hangars | | X | X | | | | | | | | |
| 2012 | C2 | 8 | Realignment of Perimeter Road (Phase 3) | | | X | X | | | | | | | |
| 2012 | C2 | 9 | Demolish 24 Acquired Homes | | | X | X | | | | | | | |
| 2012 | C2 | 10 | Remove Various Structures | | | X | X | | | | | | | |
| 2012 | C2 | 11 | Instrument Landing System (ILS) | | | | | X | | | | | | |
| 2012 | C2 | 12 | Reconfigure Golf Course | | | | X | X | | | | | | |
| 2012 | C2 | | TOTAL | | | | | | | | | | | |
| 2012 | C3 | 1 | New Glycol Facility | | X | X | | | | | | | | |
| 2012 | C3 | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | X | X | | | | | | | | |
| 2012 | C3 | 3 | Replacement Runway | | X | X | X | X | | | | | | |
| 2012 | C3 | 4 | Construct Additional Taxiways | | X | X | X | X | | | | | | |
| 2012 | C3 | 5 | Realignment of Stelzer Road | | X | X | | | | | | | | |
| 2012 | C3 | 6 | Remove Control Tower Building #7 | | X | X | | | | | | | | |
| 2012 | C3 | 7 | Demolish One Hangar | | X | X | | | | | | | | |
| 2012 | C3 | 8 | Realignment of Perimeter Road (Phase 3) | | | X | X | | | | | | | |
| 2012 | C3 | 9 | Demolish 15 Acquired Homes | | | X | X | | | | | | | |
| 2012 | C3 | 10 | Remove Various Structures | | | X | X | | | | | | | |
| 2012 | C3 | 11 | Instrument Landing System (ILS) | | | | | X | | | | | | |
| 2012 | C3 | 12 | Reconfigure Golf Course | | | | X | X | | | | | | |
| 2012 | C3 | | TOTAL | | | | | | | | | | | |

| Phase | No. | Project | CONSTRUCTION YEAR 2008 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2009 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2010 Emissions in tons per year | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 |
| C2 | 1 | Expansion Glycol Storage Facility/Wastewater Detention | | | | | | 1.78 | 0.39 | 2.72 | 0.63 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C2 | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | | | | | 0.90 | 0.16 | 1.08 | 0.26 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C2 | 3 | Replacement Runway | | | | | | 0.95 | 0.14 | 0.98 | 0.35 | 0.06 | 1.33 | 0.20 | 1.37 | 0.49 | 0.08 |
| C2 | 4 | Construct Additional Taxiways | | | | | | 2.28 | 0.34 | 2.35 | 0.84 | 0.13 | 6.83 | 1.02 | 7.04 | 2.53 | 0.40 |
| C2 | 5 | Realignment of Stelzer Road | | | | | | 0.077 | 0.013 | 0.091 | 0.024 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| C2 | 6 | Remove Portions of Columbus International Aircenter, including Control Tower Building #7 | | | | | | 0.22 | 0.03 | 0.23 | 0.08 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C2 | 7 | Demolish Two Hangars | | | | | | 5.60 | 0.84 | 5.79 | 2.03 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C2 | 8 | Realignment of Perimeter Road (Phase 3) | | | | | | | | | | | 1.46 | 0.25 | 1.70 | 0.46 | 0.09 |
| C2 | 9 | Demolish 24 Acquired Homes | | | | | | | | | | | 1.60 | 0.23 | 1.59 | 0.58 | 0.09 |
| C2 | 10 | Remove Various Structures | | | | | | | | | | | 4.37 | 0.63 | 4.32 | 1.59 | 0.26 |
| C2 | 11 | Instrument Landing System (ILS) | | | | | | | | | | | | | | | |
| C2 | 12 | Reconfigure Golf Course | | | | | | | | | | | | | | | |
| C2 | | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.80 | 1.92 | 13.22 | 4.21 | 0.70 | 15.59 | 2.32 | 16.01 | 5.64 | 0.92 |
| C3 | 1 | New Glycol Facility | | | | | | 1.78 | 0.39 | 2.72 | 0.63 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C3 | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | | | | | 0.90 | 0.16 | 1.08 | 0.26 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C3 | 3 | Replacement Runway | | | | | | 0.95 | 0.14 | 0.98 | 0.35 | 0.06 | 1.33 | 0.20 | 1.37 | 0.49 | 0.08 |
| C3 | 4 | Construct Additional Taxiways | | | | | | 2.24 | 0.33 | 2.31 | 0.83 | 0.13 | 6.73 | 1.00 | 6.93 | 2.49 | 0.40 |
| C3 | 5 | Realignment of Stelzer Road | | | | | | 0.077 | 0.013 | 0.091 | 0.024 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| C3 | 6 | Remove Control Tower Building #7 | | | | | | 0.22 | 0.03 | 0.23 | 0.08 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C3 | 7 | Demolish One Hangar | | | | | | 5.60 | 0.84 | 5.79 | 2.03 | 0.33 | | | | | |
| C3 | 8 | Realignment of Perimeter Road (Phase 3) | | | | | | | | | | | 1.46 | 0.25 | 1.70 | 0.46 | 0.09 |
| C3 | 9 | Demolish 15 Acquired Homes | | | | | | | | | | | 1.00 | 0.14 | 0.99 | 0.36 | 0.06 |
| C3 | 10 | Remove Various Structures | | | | | | | | | | | 4.37 | 0.63 | 4.32 | 1.59 | 0.26 |
| C3 | 11 | Instrument Landing System (ILS) | | | | | | | | | | | | | | | |
| C3 | 12 | Reconfigure Golf Course | | | | | | | | | | | | | | | |
| C3 | | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.77 | 1.91 | 13.19 | 4.20 | 0.69 | 14.89 | 2.22 | 15.31 | 5.39 | 0.88 |

| Phase | No. | Project | CONSTRUCTION YEAR 2011 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2012 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2013 Emissions in tons per year | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 |
| C2 | 1 | Expansion Glycol Storage Facility/Wastewater Detention | | | | | | | | | | | | | | | |
| C2 | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | | | | | | | | | | | | | | |
| C2 | 3 | Replacement Runway | 8.74 | 1.30 | 9.00 | 3.22 | 0.52 | 7.98 | 1.19 | 8.22 | 2.94 | 0.47 | | | | | |
| C2 | 4 | Construct Additional Taxiways | 19.12 | 2.86 | 19.70 | 7.09 | 1.13 | 17.30 | 2.58 | 17.83 | 6.41 | | | | | | |
| C2 | 5 | Realignment of Stelzer Road | | | | | | | | | | | | | | | |
| C2 | 6 | Remove Portions of Columbus International Aircenter, including Control Tower Building #7 | | | | | | | | | | | | | | | |
| C2 | 7 | Demolish Two Hangars | | | | | | | | | | | | | | | |
| C2 | 8 | Realignment of Perimeter Road (Phase 3) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| C2 | 9 | Demolish 24 Acquired Homes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| C2 | 10 | Remove Various Structures | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| C2 | 11 | Instrument Landing System (ILS) | | | | | | 0.37 | 0.05 | 0.33 | 0.11 | 0.02 | | | | | |
| C2 | 12 | Reconfigure Golf Course | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | | | | | |
| C2 | | TOTAL | 27.98 | 4.18 | 28.86 | 10.34 | 1.65 | 25.77 | 3.85 | 26.53 | 9.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C3 | 1 | New Glycol Facility | | | | | | | | | | | | | | | |
| C3 | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | | | | | | | | | | | | | | |
| C3 | 3 | Replacement Runway | 8.74 | 1.30 | 9.00 | 3.22 | 0.52 | 7.98 | 1.19 | 8.22 | 2.94 | 0.47 | | | | | |
| C3 | 4 | Construct Additional Taxiways | 18.83 | 2.81 | 19.41 | 6.98 | 1.11 | 17.04 | 2.54 | 17.56 | 6.31 | 1.00 | | | | | |
| C3 | 5 | Realignment of Stelzer Road | | | | | | | | | | | | | | | |
| C3 | 6 | Remove Control Tower Building #7 | | | | | | | | | | | | | | | |
| C3 | 7 | Demolish One Hangar | | | | | | | | | | | | | | | |
| C3 | 8 | Realignment of Perimeter Road (Phase 3) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| C3 | 9 | Demolish 15 Acquired Homes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| C3 | 10 | Remove Various Structures | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| C3 | 11 | Instrument Landing System (ILS) | | | | | | 0.37 | 0.05 | 0.33 | 0.11 | 0.02 | | | | | |
| C3 | 12 | Reconfigure Golf Course | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | | | | | |
| C3 | | TOTAL | 27.70 | 4.14 | 28.56 | 10.23 | 1.63 | 25.51 | 3.81 | 26.26 | 9.40 | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Construction Emissions Page 2**
**Port Columbus International Airport**

| | | | | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2018 | C2 | 1 | Expansion Glycol Storage Facility/Wastewater Detention | | X | X | | | | | | | | |
| | | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | X | X | | | | | | | | |
| | | 3 | Replacement Runway | | X | X | X | X | | | | | | |
| | | 4 | Construct Additional Taxiways | | X | X | X | X | | | | | | |
| | | 5 | Realignment of Stelzer Road | | X | X | | | | | | | | |
| | | 6 | Remove Portions of Columbus International Aircenter, including Control Tower Building #7 | | X | X | | | | | | | | |
| | | 7 | Demolish Two Hangars | | X | X | | | | | | | | |
| | | 8 | Realignment of Perimeter Road (Phase 3) | | | X | X | | | | | | | |
| | | 9 | Demolish 24 Acquired Homes | | | X | X | | | | | | | |
| | | 10 | Remove Various Structures | | | X | X | | | | | | | |
| | | 11 | Instrument Landing System (ILS) | | | | | X | | | | | | |
| | | 12 | Reconfigure Golf Course | | | | | X | | | | | | |
| | | 13 | Relocated Utility Corridor along International Gateway | | | | | | | X | X | X | X | |
| | | 14 | Extended Parking - Red Lot | | | | | | | | X | | | |
| | | 15 | Underground Aircraft Fuel Hydrant System | | | | | | | | X | X | X | X |
| | | 16 | New Heating, Venting, and Air Conditioning Plant (HVAC) | | | | | | | | | X | X | |
| | | 17 | New Passenger Terminal | | | | | | | | | X | X | X |
| | | | | | | | | | | | | X | X | X |
| | | 18 | New Apron Area for New Terminal | | | | | | | | | | X | X |
| | | 19 | New Parking Garage Connectors | | | | | | | | | | X | X |
| | | 20 | New Parking Garage | | | | | | | | | | X | X |
| | | | TOTAL | | | | | | | | | | | |
| | C3 | 1 | New Glycol Facility | | X | X | | | | | | | | |
| | | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | X | X | | | | | | | | |
| | | 3 | Replacement Runway | | X | X | X | X | | | | | | |
| | | 4 | Construct Additional Taxiways | | X | X | X | X | | | | | | |
| | | 5 | Realignment of Stelzer Road | | X | X | | | | | | | | |
| | | 6 | Remove Control Tower Building #7 | | X | X | | | | | | | | |
| | | 7 | Demolish One Hangar | | X | X | | | | | | | | |
| | | 8 | Realignment of Perimeter Road (Phase 3) | | | X | X | | | | | | | |
| | | 9 | Demolish 15 Acquired Homes | | | X | X | | | | | | | |
| | | 10 | Remove Various Structures | | | X | X | | | | | | | |
| | | 11 | Instrument Landing System (ILS) | | | | | X | | | | | | |
| | | 12 | Reconfigure Golf Course | | | | | X | | | | | | |
| | | 13 | Relocated Utility Corridor along International Gateway | | | | | | | X | X | X | X | |
| | | 14 | Extended Parking - Red Lot | | | | | | | | X | | | |
| | | 15 | Underground Aircraft Fuel Hydrant System | | | | | | | | X | X | X | X |
| | | 16 | New Heating, Venting, and Air Conditioning Plant (HVAC) | | | | | | | | | X | X | |
| | | 17 | New Passenger Terminal | | | | | | | | | X | X | X |
| | | 18 | New Apron Area for New Terminal | | | | | | | | | | X | X |
| | | 19 | New Parking Garage Connectors | | | | | | | | | | X | X |
| | | 20 | New Parking Garage | | | | | | | | | | X | X |
| | | | TOTAL | | | | | | | | | | | |

| | | | CONSTRUCTION YEAR 2008 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2009 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2010 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2011 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2012 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2013 Emissions in tons per year | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | |
| C2 | 1 | Expansion Glycol Storage Facility/Wastewater Detention | | | | | | 1.78 | 0.39 | 2.72 | 0.63 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | | | | | 0.90 | 0.16 | 1.08 | 0.26 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 3 | Replacement Runway | | | | | | 0.95 | 0.14 | 0.98 | 0.35 | 0.06 | 1.33 | 0.20 | 1.37 | 0.49 | 0.08 | 8.74 | 1.30 | 9.00 | 3.22 | 0.52 | 7.98 | 1.19 | 8.22 | 2.94 | 0.47 | | | | | | |
| | 4 | Construct Additional Taxiways | | | | | | 2.28 | 0.34 | 2.35 | 0.84 | 0.13 | 6.83 | 1.02 | 7.04 | 2.53 | 0.40 | 19.12 | 2.86 | 19.70 | 7.09 | 1.13 | 17.30 | 2.58 | 17.83 | 6.41 | 0.00 | | | | | | |
| | 5 | Realignment of Stelzer Road | | | | | | 0.077 | 0.013 | 0.091 | 0.024 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | |
| | 6 | Remove Portions of Columbus International Aircenter, including Control Tower Building #7 | | | | | | 0.22 | 0.03 | 0.23 | 0.08 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 7 | Demolish Two Hangars | | | | | | 5.60 | 0.84 | 5.79 | 2.03 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 8 | Realignment of Perimeter Road (Phase 3) | | | | | | | | | | | 1.46 | 0.25 | 1.70 | 0.46 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| | 9 | Demolish 24 Acquired Homes | | | | | | | | | | | 1.60 | 0.23 | 1.59 | 0.58 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| | 10 | Remove Various Structures | | | | | | | | | | | 4.37 | 0.63 | 4.32 | 1.59 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| | 11 | Instrument Landing System (ILS) | | | | | | | | | | | | | | | | | | | | | 0.37 | 0.05 | 0.33 | 0.11 | 0.02 | | | | | | |
| | 12 | Reconfigure Golf Course | | | | | | | | | | | | | | | | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | | | | | | |
| | 13 | Relocated Utility Corridor along International Gateway | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 14 | Extended Parking - Red Lot | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 | Underground Aircraft Fuel Hydrant System | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 16 | New Heating, Venting, and Air Conditioning Plant (HVAC) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 17 | New Passenger Terminal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18 | New Apron Area for New Terminal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 19 | New Parking Garage Connectors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 20 | New Parking Garage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.80 | 1.92 | 13.22 | 4.21 | 0.70 | 15.59 | 2.32 | 16.01 | 5.64 | 0.92 | 27.98 | 4.18 | 28.86 | 10.34 | 1.65 | 25.77 | 3.85 | 26.53 | 9.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| C3 | 1 | New Glycol Facility | | | | | | 1.78 | 0.39 | 2.72 | 0.63 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | | | | | 0.90 | 0.16 | 1.08 | 0.26 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 3 | Replacement Runway | | | | | | 0.95 | 0.14 | 0.98 | 0.35 | 0.06 | 1.33 | 0.20 | 1.37 | 0.49 | 0.08 | 8.74 | 1.30 | 9.00 | 3.22 | 0.52 | 7.98 | 1.19 | 8.22 | 2.94 | 0.47 | | | | | | |
| | 4 | Construct Additional Taxiways | | | | | | 2.24 | 0.33 | 2.31 | 0.83 | 0.13 | 6.73 | 1.00 | 6.93 | 2.49 | 0.40 | 18.83 | 2.81 | 19.41 | 6.98 | 1.11 | 17.04 | 2.54 | 17.56 | 6.31 | 1.00 | | | | | | |
| | 5 | Realignment of Stelzer Road | | | | | | 0.077 | 0.013 | 0.091 | 0.024 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | | | | | | | |
| | 6 | Remove Control Tower Building #7 | | | | | | 0.22 | 0.03 | 0.23 | 0.08 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 7 | Demolish One Hangar | | | | | | 5.60 | 0.84 | 5.79 | 2.03 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | | | | | | |
| | 8 | Realignment of Perimeter Road (Phase 3) | | | | | | | | | | | 1.46 | 0.25 | 1.70 | 0.46 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| | 9 | Demolish 15 Acquired Homes | | | | | | | | | | | 1.00 | 0.14 | 0.99 | 0.36 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| | 10 | Remove Various Structures | | | | | | | | | | | 4.37 | 0.63 | 4.32 | 1.59 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| | 11 | Instrument Landing System (ILS) | | | | | | | | | | | | | | | | | | | | | 0.37 | 0.05 | 0.33 | 0.11 | 0.02 | | | | | | |
| | 12 | Reconfigure Golf Course | | | | | | | | | | | | | | | | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | | | | | | |
| | 13 | Relocated Utility Corridor along International Gateway | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 14 | Extended Parking - Red Lot | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 15 | Underground Aircraft Fuel Hydrant System | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 16 | New Heating, Venting, and Air Conditioning Plant (HVAC) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 17 | New Passenger Terminal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18 | New Apron Area for New Terminal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 19 | New Parking Garage Connectors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 20 | New Parking Garage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.77 | 1.91 | 13.19 | 4.20 | 0.69 | 14.89 | 2.22 | 15.31 | 5.39 | 0.88 | 27.70 | 4.14 | 28.56 | 10.23 | 1.63 | 25.51 | 3.81 | 26.26 | 9.40 | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| | | 2009-2013 | | | | | | 11.77 | 1.91 | 13.19 | 4.20 | 0.69 | 14.89 | 2.22 | 15.31 | 5.39 | 0.88 | 27.70 | 4.14 | 28.56 | 10.23 | 1.63 | 25.51 | 3.81 | 26.26 | 9.40 | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| | | 2014-2018 | | | | | | 0.55 | 0.09 | 0.61 | 0.17 | 0.03 | 3.23 | 0.31 | 1.53 | 0.94 | 0.06 | 4.48 | 0.65 | 3.94 | 1.10 | 0.14 | 17.61 | 1.86 | 9.78 | 5.02 | 0.37 | 17.44 | 1.84 | 9.63 | 4.98 | 0.36 | |
| | | | | | | | | 12.32 | 2.00 | 13.80 | 4.37 | 0.73 | 18.11 | 2.53 | 16.84 | 6.33 | 0.94 | 32.18 | 4.79 | 32.50 | 11.33 | 1.78 | 43.12 | 5.67 | 36.04 | 14.42 | 1.87 | 17.44 | 1.84 | 9.63 | 4.98 | 0.36 | 295.90 |

**Construction Emissions Page 3**
Port Columbus International Airport

| | | # | Project | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2018 | C2 | 1 | Expansion Glycol Storage Facility/Wastewater Detention | | X | X | | | | | | | | |
| | | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | X | X | | | | | | | | |
| | | 3 | Replacement Runway | | X | X | X | X | | | | | | |
| | | 4 | Construct Additional Taxiways | | X | X | X | X | | | | | | |
| | | 5 | Realignment of Stelzer Road | | X | X | | | | | | | | |
| | | 6 | Remove Portions of Columbus International Aircenter, including Control Tower Building #7 | | X | X | | | | | | | | |
| | | 7 | Demolish Two Hangars | | X | X | | | | | | | | |
| | | 8 | Realignment of Perimeter Road (Phase 3) | | | X | X | | | | | | | |
| | | 9 | Demolish 24 Acquired Homes | | | X | X | | | | | | | |
| | | 10 | Remove Various Structures | | | X | X | | | | | | | |
| | | 11 | Instrument Landing System (ILS) | | | | | X | | | | | | |
| | | 12 | Reconfigure Golf Course | | | | X | X | | | | | | |
| | | 13 | Relocated Utility Corridor along International Gateway | | | | | | | X | X | X | X | |
| | | | | | | | | | | | | | | |
| | | 14 | Extended Parking - Red Lot | | | | | | | | X | | | |
| | | 15 | Underground Aircraft Fuel Hydrant System | | | | | | | | X | X | X | X |
| | | 16 | New Heating, Venting, and Air Conditioning Plant (HVAC) | | | | | | | | | X | X | |
| | | 17 | New Passenger Terminal | | | | | | | | | X | X | X |
| | | | | | | | | | | | | X | X | X |
| | | 18 | New Apron Area for New Terminal | | | | | | | | | | X | X |
| | | 19 | New Parking Garage Connectors | | | | | | | | | | X | X |
| | | 20 | New Parking Garage | | | | | | | | | | X | X |
| | | | TOTAL | | | | | | | | | | | |
| | C3 | 1 | New Glycol Facility | | X | X | | | | | | | | |
| | | 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | | X | X | | | | | | | | |
| | | 3 | Replacement Runway | | X | X | X | X | | | | | | |
| | | 4 | Construct Additional Taxiways | | X | X | X | X | | | | | | |
| | | 5 | Realignment of Stelzer Road | | X | X | | | | | | | | |
| | | 6 | Remove Control Tower Building #7 | | X | X | | | | | | | | |
| | | 7 | Demolish One Hangar | | X | X | | | | | | | | |
| | | 8 | Realignment of Perimeter Road (Phase 3) | | | X | X | | | | | | | |
| | | 9 | Demolish 15 Acquired Homes | | | X | X | | | | | | | |
| | | 10 | Remove Various Structures | | | X | X | | | | | | | |
| | | 11 | Instrument Landing System (ILS) | | | | | X | | | | | | |
| | | 12 | Reconfigure Golf Course | | | | X | X | | | | | | |
| | | 13 | Relocated Utility Corridor along International Gateway | | | | | | | X | X | X | X | |
| | | | | | | | | | | | | | | |
| | | 14 | Extended Parking - Red Lot | | | | | | | | X | | | |
| | | 15 | Underground Aircraft Fuel Hydrant System | | | | | | | | X | X | X | X |
| | | 16 | New Heating, Venting, and Air Conditioning Plant (HVAC) | | | | | | | | | X | X | |
| | | 17 | New Passenger Terminal | | | | | | | | | X | X | X |
| | | | | | | | | | | | | | | |
| | | 18 | New Apron Area for New Terminal | | | | | | | | | | X | X |
| | | 19 | New Parking Garage Connectors | | | | | | | | | | X | X |
| | | 20 | New Parking Garage | | | | | | | | | | X | X |
| | | | TOTAL | | | | | | | | | | | |

| | # | CONSTRUCTION YEAR 2014 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2015 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2016 Emissions in tons per year | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 |
| C2 | 13 | 0.55 | 0.09 | 0.61 | 0.17 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 14 | | | | | | 3.11 | 0.30 | 1.47 | 0.91 | 0.06 | | | | | |
| | 15 | | | | | | 0.12 | 0.01 | 0.06 | 0.03 | 0.00 | 0.12 | 0.01 | 0.06 | 0.03 | 0.00 |
| | 16 | | | | | | | | | | | 0.187 | 0.010 | 0.029 | 0.059 | 0.001 |
| | 17 | | | | | | | | | | | 4.18 | 0.63 | 3.84 | 1.00 | 0.14 |
| | TOTAL | 0.55 | 0.09 | 0.61 | 0.17 | 0.03 | 3.23 | 0.31 | 1.53 | 0.94 | 0.06 | 4.48 | 0.65 | 3.94 | 1.10 | 0.14 |
| C3 | 13 | 0.55 | 0.09 | 0.61 | 0.17 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 14 | | | | | | 3.11 | 0.30 | 1.47 | 0.91 | 0.06 | | | | | |
| | 15 | | | | | | 0.12 | 0.01 | 0.06 | 0.03 | 0.00 | 0.12 | 0.01 | 0.06 | 0.03 | 0.00 |
| | 16 | | | | | | | | | | | 0.187 | 0.010 | 0.029 | 0.059 | 0.001 |
| | 17 | | | | | | | | | | | 4.18 | 0.63 | 3.84 | 1.00 | 0.14 |
| | TOTAL | 0.55 | 0.09 | 0.61 | 0.17 | 0.03 | 3.23 | 0.31 | 1.53 | 0.94 | 0.06 | 4.48 | 0.65 | 3.94 | 1.10 | 0.14 |

| | # | CONSTRUCTION YEAR 2017 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2018 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2019 Emissions in tons per year | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 |
| C2 | 13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | |
| | 16 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | |
| | 17 | 6.35 | 0.95 | 5.84 | 1.53 | 0.21 | 6.18 | 0.93 | 5.69 | 1.49 | 0.21 | | | | | |
| | 18 | 7.09 | 0.38 | 0.89 | 2.40 | 0.04 | 7.09 | 0.38 | 0.89 | 2.40 | 0.04 | | | | | |
| | 19 | 0.07 | 0.01 | 0.03 | 0.02 | 0.001 | 0.07 | 0.01 | 0.03 | 0.02 | 0.00 | | | | | |
| | 20 | 4.10 | 0.52 | 3.02 | 1.07 | 0.11 | 4.10 | 0.52 | 3.02 | 1.07 | 0.11 | | | | | |
| | TOTAL | 17.61 | 1.86 | 9.78 | 5.02 | 0.37 | 17.44 | 1.84 | 9.63 | 4.98 | 0.36 | | | | | |
| C3 | 13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| | 16 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | |
| | 17 | 6.35 | 0.95 | 5.84 | 1.53 | 0.21 | 6.18 | 0.93 | 5.69 | 1.49 | 0.21 | | | | | |
| | 18 | 7.09 | 0.38 | 0.89 | 2.40 | 0.04 | 7.09 | 0.38 | 0.89 | 2.40 | 0.04 | | | | | |
| | 19 | 0.07 | 0.01 | 0.03 | 0.02 | 0.001 | 0.07 | 0.01 | 0.03 | 0.02 | 0.00 | | | | | |
| | 20 | 4.10 | 0.52 | 3.02 | 1.07 | 0.11 | 4.10 | 0.52 | 3.02 | 1.07 | 0.11 | | | | | |
| | TOTAL | 17.61 | 1.86 | 9.78 | 5.02 | 0.37 | 17.44 | 1.84 | 9.63 | 4.98 | 0.36 | | | | | |

60.76

Construction Emissions Page 4
Port Columbus International Airport

2012 Sub-Alternative for Runway Development

C3

| | | | | | | CONSTRUCTION YEAR 2009 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2010 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2011 Emissions in tons per year | | | | | CONSTRUCTION YEAR 2012 Emissions in tons per year | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2009 | 2010 | 2011 | 2012 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 | CO | HC | NOx | SOx | PM10 |
| 1 | Expansion Glycol Storage Facility/Wastewater Detention | X | X | | | 1.78 | 0.39 | 2.72 | 0.63 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| 2 | Install Utility Lines (Power, Waste, Water) South Airport Property | X | X | | | 0.90 | 0.16 | 1.08 | 0.26 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| 3 | Replacement Runway | X | X | X | X | 0.95 | 0.14 | 0.98 | 0.35 | 0.06 | 1.33 | 0.20 | 1.37 | 0.49 | 0.08 | 8.74 | 1.30 | 9.00 | 3.22 | 0.52 | 7.98 | 1.19 | 8.22 | 2.94 | 0.47 |
| 4 | Construct Additional Taxiways | X | X | X | X | 2.24 | 0.33 | 2.31 | 0.83 | 0.13 | 6.73 | 1.00 | 6.93 | 2.49 | 0.40 | 18.83 | 2.81 | 19.41 | 6.98 | 1.11 | 17.04 | 2.54 | 17.56 | 6.31 | 1.00 |
| 5 | Realignment of Stelzer Road | X | X | | | 0.077 | 0.013 | 0.091 | 0.024 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | | | | | |
| 6 | Remove Control Tower Building #7 | X | X | | | 0.22 | 0.03 | 0.23 | 0.08 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| 7 | Demolish One Hangar | X | X | | | 5.60 | 0.84 | 5.79 | 2.03 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | |
| 8 | Realignment of Perimeter Road (Phase 3) | | X | X | | | | | | | 1.46 | 0.25 | 1.70 | 0.46 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | |
| 9 | Demolish 15 Acquired Homes | | X | X | | | | | | | 1.00 | 0.14 | 0.99 | 0.36 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | |
| 10 | Remove Various Structures | | X | X | | | | | | | 4.37 | 0.63 | 4.32 | 1.59 | 0.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | |
| 11 | Instrument Landing System (ILS) | | | | X | | | | | | | | | | | | | | | | 0.37 | 0.05 | 0.33 | 0.11 | 0.02 |
| 12 | Reconfigure Golf Course | | | | X | | | | | | | | | | | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 | 0.12 | 0.02 | 0.15 | 0.03 | 0.01 |
| 13 | Relocated Utility Corridor along International Gateway | | | | | 0.55 | 0.09 | 0.61 | 0.17 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14 | Extended Parking - Red Lot | X | | | | 3.11 | 0.30 | 1.47 | 0.91 | 0.06 | | | | | | | | | | | | | | | |
| 15 | Underground Aircraft Fuel Hydrant System | X | X | X | X | 0.12 | 0.01 | 0.06 | 0.03 | 0.00 | 0.12 | 0.01 | 0.06 | 0.03 | 0.00 | | | | | | | | | | |
| 16 | New Heating, Venting, and Air Conditioning Plant (HVAC) | | X | X | | | | | | | 0.187 | 0.010 | 0.029 | 0.059 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | |
| 17 | New Passenger Terminal | | X | X | X | | | | | | 2.72 | 0.41 | 2.50 | 0.65 | 0.09 | 4.13 | 0.62 | 3.80 | 0.99 | 0.14 | 4.02 | 0.60 | 3.70 | 0.97 | 0.14 |
| 18 | New Apron Area for New Terminal | | X | X | X | | | | | | 2.70 | 0.14 | 0.34 | 0.91 | 0.02 | 2.70 | 0.14 | 0.34 | 0.91 | 0.02 | 2.70 | 0.14 | 0.34 | 0.91 | 0.02 |
| 19 | New Parking Garage Connectors | | | X | X | | | | | | | | | | | 0.07 | 0.01 | 0.03 | 0.02 | 0.001 | 0.07 | 0.01 | 0.03 | 0.02 | 0.00 |
| 20 | New Parking Garage | | | X | X | | | | | | | | | | | 4.10 | 0.52 | 3.02 | 1.07 | 0.11 | 4.10 | 0.52 | 3.02 | 1.07 | 0.11 |
| | TOTAL | | | | | 15.54 | 2.31 | 15.33 | 5.31 | 0.79 | 20.61 | 2.79 | 18.24 | 7.05 | 0.99 | 38.70 | 5.43 | 35.75 | 13.23 | 1.90 | 36.40 | 5.08 | 33.35 | 12.38 | 1.77 |

# ATTACHMENT 7
# MOBILE 6.2 INPUT AND OUTPUT FILES

The metropolitan planning organization in Columbus, MORPC, created motor vehicle emission data using the USEPA MOBILE emission factor computer model for the transportation modeling required for the Transportation Improvement Plan (TIP). These files were provided to FAA for use in calculating emission factors for motor vehicles for the EIS air quality assessment. The files were revised to reflect the analysis years used for the EIS, 2006, 2012, and 2018. Copies of the computer input and output files are provided in this attachment.

```
*****************************************************************************
* MOBILE6.2 (31-Oct-2002)                                                   *
* Input file: CMH06MOB.IN (file 1, run 1).                                  *
*****************************************************************************

* Reading Registration Distributions from the following external
* data file: COLREGS.D

* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 2.5

* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  2.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   33. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.036
                                         Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:              <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.4145    0.3128    0.1369              0.0377    0.0005
0.0021    0.0895    0.0060    1.0000

------------------------------------------------------------------------------------
----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :     11.391    16.742    10.424    14.819    15.337    1.155
1.576     1.570      8.86    12.161
     Composite CO  :     44.01     53.07     47.44     51.36     66.06     4.440
3.485    12.874    106.61    45.627
     Composite NOX :      1.874     2.560     2.927     2.672     2.712    1.965
2.068    16.428      1.05     3.563

------------------------------------------------------------------------------------
----------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.218     0.372     0.314     0.354              0.228
0.216                0.384
```

```
      VOC   Running:     1.404     2.594     2.521     2.572               0.928
1.360                7.627
  VOC Total Exhaust:     1.622     2.965     2.836     2.926     3.341     1.155
1.576     1.570      8.01     2.306

           CO Start:      3.13      6.31      4.82      5.86               0.742
0.447                2.830
         CO Running:     40.87     46.76     42.62     45.50               3.699
3.038              103.785
   CO Total Exhaust:     44.01     53.07     47.44     51.36     66.06     4.440
3.485    12.874    106.61    45.627

          NOx Start:     0.137     0.285     0.228     0.268               0.066
0.045                0.382
        NOx Running:     1.737     2.274     2.699     2.404               1.900
2.023                0.665
  NOx Total Exhaust:     1.874     2.560     2.927     2.672     2.712     1.965
2.068    16.428      1.05     3.563

-------------------------------------------------------------------------------------
----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.223     0.350     0.161     0.292     0.292     0.000
0.000     0.000     0.387     0.237
       Diurnal Loss:     0.031     0.043     0.025     0.038     0.053     0.000
0.000     0.000     0.115     0.033
       Resting Loss:     0.099     0.158     0.078     0.133     0.175     0.000
0.000     0.000     0.351     0.110
       Running Loss:     9.332    13.047     7.042    11.219    11.063     0.000
0.000     0.000     0.000     9.331
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.009
     Refueling Loss:     0.074     0.166     0.271     0.198     0.403     0.000
0.000     0.000     0.000     0.135
  Total Non-Exhaust:     9.769    13.777     7.588    12.203    11.996     0.000
0.000     0.000     0.853     9.855

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 15.0

* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 15.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   33. ppm
```

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000 Alcohol Blend Market Share: 0.420
Ether Blend Oxygen Content: 0.000 Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.4145 | 0.3128 | 0.1369 | | 0.0377 | 0.0005 | 0.0021 | 0.0895 | 0.0060 | 1.0000 |

Composite Emission Factors (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 1.689 | 2.604 | 1.973 | 2.412 | 2.873 | 0.741 | 0.969 | 0.869 | 3.06 | 1.992 |
| Composite CO : | 14.46 | 20.00 | 17.21 | 19.15 | 24.68 | 2.244 | 1.681 | 5.229 | 21.49 | 16.136 |
| Composite NOX : | 1.058 | 1.597 | 1.793 | 1.657 | 3.065 | 1.283 | 1.342 | 10.737 | 0.93 | 2.269 |

Exhaust emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.218 | 0.372 | 0.314 | 0.354 | | 0.228 | 0.216 | | 0.384 | |
| VOC Running: | 0.372 | 0.656 | 0.637 | 0.650 | | 0.514 | 0.753 | | 1.826 | |
| VOC Total Exhaust: | 0.590 | 1.028 | 0.951 | 1.005 | 1.192 | 0.741 | 0.969 | 0.869 | 2.21 | 0.835 |
| CO Start: | 3.13 | 6.31 | 4.82 | 5.86 | | 0.742 | 0.447 | | 2.830 | |
| CO Running: | 11.33 | 13.69 | 12.39 | 13.29 | | 1.502 | 1.234 | | 18.656 | |
| CO Total Exhaust: | 14.46 | 20.00 | 17.21 | 19.15 | 24.68 | 2.244 | 1.681 | 5.229 | 21.49 | 16.136 |
| NOx Start: | 0.137 | 0.285 | 0.228 | 0.268 | | 0.066 | 0.045 | | 0.382 | |
| NOx Running: | 0.921 | 1.312 | 1.565 | 1.389 | | 1.218 | 1.297 | | 0.552 | |
| NOx Total Exhaust: | 1.058 | 1.597 | 1.793 | 1.657 | 3.065 | 1.283 | 1.342 | 10.737 | 0.93 | 2.269 |

Non-Exhaust Emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Hot Soak Loss: | 0.223 | 0.350 | 0.161 | 0.292 | 0.292 | 0.000 | 0.000 | 0.000 | 0.387 | 0.237 |
| Diurnal Loss: | 0.031 | 0.043 | 0.025 | 0.038 | 0.053 | 0.000 | 0.000 | 0.000 | 0.115 | 0.033 |
| Resting Loss: | 0.099 | 0.158 | 0.078 | 0.133 | 0.175 | 0.000 | 0.000 | 0.000 | 0.351 | 0.110 |
| Running Loss: | 0.663 | 0.847 | 0.476 | 0.734 | 0.749 | 0.000 | 0.000 | 0.000 | 0.000 | 0.633 |
| Crankcase Loss: | 0.009 | 0.012 | 0.011 | 0.012 | 0.010 | 0.000 | | | | |

```
0.000     0.000     0.000     0.009
     Refueling Loss:     0.074     0.166     0.271     0.198     0.403     0.000
0.000     0.000     0.000     0.135
  Total Non-Exhaust:     1.099     1.576     1.022     1.436     1.682     0.000
0.000     0.000     0.853     1.157

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 25.0

* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   33. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.036
                                         Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
                GVWR:              <6000     >6000     (All)
                          ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.4145    0.3128    0.1369              0.0377    0.0005
0.0021    0.0895    0.0060    1.0000

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 Composite Emission Factors (g/mi):
     Composite VOC :      1.277     2.021     1.554     1.879     1.980    0.581
0.734     0.598      2.51     1.520
     Composite CO  :     12.48     17.67     15.17     16.91     14.39     1.638
1.184     3.121     14.01    13.687
     Composite NOX :      0.889     1.401     1.565     1.451     3.347    1.067
1.111     8.928      1.05     1.955

------------------------------------------------------------------------------------
---------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.218     0.372     0.314     0.354               0.228
```

```
0.216                0.384
      VOC   Running:     0.261     0.457     0.443     0.452               0.353
0.518                1.271
  VOC Total Exhaust:     0.479     0.828     0.757     0.807     0.630     0.581
0.734     0.598      1.66     0.650

           CO Start:      3.13      6.31      4.82      5.86               0.742
0.447                2.830
         CO Running:      9.35     11.36     10.35     11.05               0.897
0.736               11.180
   CO Total Exhaust:     12.48     17.67     15.17     16.91     14.39     1.638
1.184     3.121     14.01    13.687

          NOx Start:     0.137     0.285     0.228     0.268               0.066
0.045                0.382
        NOx Running:     0.752     1.115     1.337     1.183               1.001
1.066                0.665
  NOx Total Exhaust:     0.889     1.401     1.565     1.451     3.347     1.067
1.111     8.928      1.05     1.955

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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.223     0.350     0.161     0.292     0.292     0.000
0.000     0.000     0.387     0.237
       Diurnal Loss:     0.031     0.043     0.025     0.038     0.053     0.000
0.000     0.000     0.115     0.033
       Resting Loss:     0.099     0.158     0.078     0.133     0.175     0.000
0.000     0.000     0.351     0.110
       Running Loss:     0.361     0.464     0.251     0.399     0.418     0.000
0.000     0.000     0.000     0.345
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.009
     Refueling Loss:     0.074     0.166     0.271     0.198     0.403     0.000
0.000     0.000     0.000     0.135
  Total Non-Exhaust:     0.798     1.193     0.797     1.093     1.351     0.000
0.000     0.000     0.853     0.869

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 30.0

* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   33. ppm
```

```
              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.4145    0.3128    0.1369              0.0377    0.0005
0.0021    0.0895    0.0060    1.0000

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 Composite Emission Factors (g/mi):
     Composite VOC :      1.195     1.908     1.478     1.777     1.766    0.531
0.660     0.513      2.35     1.423
     Composite CO  :     12.28     17.43     14.99     16.69     11.93     1.483
1.057     2.582     11.96    13.351
     Composite NOX :      0.844     1.350     1.506     1.398     3.488    1.023
1.064     8.563      1.10     1.886

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Exhaust emissions (g/mi):
        VOC   Start:     0.218     0.372     0.314     0.354               0.228
0.216               0.384
      VOC   Running:     0.242     0.420     0.408     0.417               0.303
0.444               1.113
  VOC Total Exhaust:     0.460     0.792     0.722     0.771     0.487     0.531
0.660     0.513      1.50     0.612

           CO Start:      3.13      6.31      4.82      5.86               0.742
0.447               2.830
         CO Running:      9.15     11.12     10.16     10.83               0.742
0.609               9.125
   CO Total Exhaust:     12.28     17.43     14.99     16.69     11.93     1.483
1.057     2.582     11.96    13.351

          NOx Start:     0.137     0.285     0.228     0.268               0.066
0.045               0.382
        NOx Running:     0.707     1.065     1.278     1.130               0.957
1.019               0.722
  NOx Total Exhaust:     0.844     1.350     1.506     1.398     3.488     1.023
1.064     8.563      1.10     1.886

------------------------------------------------------------------------------------
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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.223     0.350     0.161     0.292     0.292     0.000
0.000     0.000     0.387     0.237
       Diurnal Loss:     0.031     0.043     0.025     0.038     0.053     0.000
0.000     0.000     0.115     0.033
       Resting Loss:     0.099     0.158     0.078     0.133     0.175     0.000
0.000     0.000     0.351     0.110
       Running Loss:     0.299     0.386     0.209     0.332     0.346     0.000
0.000     0.000     0.000     0.286
```

```
    Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.009
    Refueling Loss:     0.074     0.166     0.271     0.198     0.403     0.000
0.000     0.000     0.000     0.135
  Total Non-Exhaust:     0.735     1.116     0.755     1.024     1.279     0.000
0.000     0.000     0.853     0.811

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 35.0

* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 35.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   33. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.4145    0.3128    0.1369              0.0377    0.0005
0.0021    0.0895    0.0060    1.0000

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 Composite Emission Factors (g/mi):
    Composite VOC :      1.129     1.813     1.411     1.691     1.618    0.493
0.605     0.449      2.23     1.344
    Composite CO  :     12.45     17.65     15.21     16.91     10.45     1.384
0.975     2.235     10.43    13.425
    Composite NOX :      0.820     1.330     1.483     1.376     3.629    1.014
1.055     8.489      1.15     1.865

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Exhaust emissions (g/mi):
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```
         VOC   Start:     0.218     0.372     0.314     0.354               0.228
0.216               0.384
       VOC   Running:     0.224     0.382     0.373     0.379               0.265
0.389               0.989
  VOC Total Exhaust:     0.442     0.754     0.687     0.734     0.393     0.493
0.605     0.449     1.37     0.578

          CO Start:      3.13      6.31      4.82      5.86               0.742
0.447               2.830
        CO Running:      9.32     11.34     10.39     11.05               0.642
0.527               7.602
   CO Total Exhaust:     12.45     17.65     15.21     16.91     10.45     1.384
0.975     2.235     10.43    13.425

         NOx Start:     0.137     0.285     0.228     0.268               0.066
0.045               0.382
       NOx Running:     0.683     1.044     1.255     1.108               0.948
1.010               0.766
  NOx Total Exhaust:     0.820     1.330     1.483     1.376     3.629     1.014
1.055     8.489     1.15     1.865

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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.223     0.350     0.161     0.292     0.292     0.000
0.000     0.000     0.387     0.237
       Diurnal Loss:     0.031     0.043     0.025     0.038     0.053     0.000
0.000     0.000     0.115     0.033
       Resting Loss:     0.099     0.158     0.078     0.133     0.175     0.000
0.000     0.000     0.351     0.110
       Running Loss:     0.251     0.329     0.178     0.283     0.292     0.000
0.000     0.000     0.000     0.242
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.009
     Refueling Loss:     0.074     0.166     0.271     0.198     0.403     0.000
0.000     0.000     0.000     0.135
  Total Non-Exhaust:     0.687     1.059     0.724     0.974     1.225     0.000
0.000     0.000     0.853     0.766

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 40.0

* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 40.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
```

Fuel Sulfur Content: 33. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000
Ether Blend Oxygen Content: 0.000

Alcohol Blend Market Share: 0.420
Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.4145 | 0.3128 | 0.1369 | | 0.0377 | 0.0005 | 0.0021 | 0.0895 | 0.0060 | 1.0000 |

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Composite Emission Factors (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 1.086 | 1.754 | 1.372 | 1.638 | 1.512 | 0.466 | 0.565 | 0.402 | 2.14 | 1.294 |
| Composite CO : | 13.16 | 18.45 | 15.97 | 17.69 | 9.67 | 1.323 | 0.925 | 2.025 | 9.37 | 14.015 |
| Composite NOX : | 0.826 | 1.341 | 1.493 | 1.387 | 3.770 | 1.039 | 1.082 | 8.700 | 1.18 | 1.897 |

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Exhaust emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.218 | 0.372 | 0.314 | 0.354 | | 0.228 | 0.216 | | 0.384 | |
| VOC Running: | 0.220 | 0.367 | 0.359 | 0.365 | | 0.238 | 0.349 | | 0.903 | |
| VOC Total Exhaust: | 0.438 | 0.739 | 0.673 | 0.719 | 0.330 | 0.466 | 0.565 | 0.402 | 1.29 | 0.562 |
| CO Start: | 3.13 | 6.31 | 4.82 | 5.86 | | 0.742 | 0.447 | | 2.830 | |
| CO Running: | 10.03 | 12.14 | 11.14 | 11.84 | | 0.582 | 0.478 | | 6.544 | |
| CO Total Exhaust: | 13.16 | 18.45 | 15.97 | 17.69 | 9.67 | 1.323 | 0.925 | 2.025 | 9.37 | 14.015 |
| NOx Start: | 0.137 | 0.285 | 0.228 | 0.268 | | 0.066 | 0.045 | | 0.382 | |
| NOx Running: | 0.689 | 1.055 | 1.265 | 1.119 | | 0.974 | 1.037 | | 0.796 | |
| NOx Total Exhaust: | 0.826 | 1.341 | 1.493 | 1.387 | 3.770 | 1.039 | 1.082 | 8.700 | 1.18 | 1.897 |

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Non-Exhaust Emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Hot Soak Loss: | 0.223 | 0.350 | 0.161 | 0.292 | 0.292 | 0.000 | 0.000 | 0.000 | 0.387 | 0.237 |
| Diurnal Loss: | 0.031 | 0.043 | 0.025 | 0.038 | 0.053 | 0.000 | 0.000 | 0.000 | 0.115 | 0.033 |
| Resting Loss: | 0.099 | 0.158 | 0.078 | 0.133 | 0.175 | 0.000 | 0.000 | 0.000 | 0.351 | 0.110 |
| Running Loss: | 0.211 | 0.285 | 0.153 | 0.245 | 0.249 | 0.000 | | | | |

```
0.000     0.000     0.000     0.207
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.009
     Refueling Loss:     0.074     0.166     0.271     0.198     0.403     0.000
0.000     0.000     0.000     0.135
  Total Non-Exhaust:     0.648     1.015     0.699     0.935     1.182     0.000
0.000     0.000     0.853     0.731

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 45.0

* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   33. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.4145    0.3128    0.1369              0.0377    0.0005
0.0021    0.0895    0.0060    1.0000

-------------------------------------------------------------------------------------
----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      1.048     1.703     1.338     1.592     1.434    0.446
0.535     0.368      2.09     1.251
     Composite CO  :     13.86     19.25     16.72     18.48      9.45     1.293
0.900     1.920      8.71    14.639
     Composite NOX :      0.837     1.358     1.511     1.405     3.911    1.101
1.148     9.217      1.20     1.962

-------------------------------------------------------------------------------------
----------------------------------
```

```
Exhaust emissions (g/mi):
        VOC   Start:     0.218     0.372     0.314     0.354               0.228
0.216                 0.384
      VOC   Running:     0.215     0.352     0.345     0.350               0.218
0.319                 0.853
  VOC Total Exhaust:     0.433     0.724     0.659     0.704     0.289     0.446
0.535     0.368      1.24     0.549

           CO Start:      3.13      6.31      4.82      5.86               0.742
0.447                 2.830
         CO Running:     10.73     12.94     11.90     12.62               0.552
0.453                 5.876
   CO Total Exhaust:     13.86     19.25     16.72     18.48      9.45     1.293
0.900     1.920      8.71    14.639

          NOx Start:     0.137     0.285     0.228     0.268               0.066
0.045                 0.382
        NOx Running:     0.700     1.073     1.283     1.137               1.036
1.103                 0.819
  NOx Total Exhaust:     0.837     1.358     1.511     1.405     3.911     1.101
1.148     9.217      1.20     1.962

-----------------------------------------------------------------------------------
----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.223     0.350     0.161     0.292     0.292     0.000
0.000     0.000     0.387     0.237
       Diurnal Loss:     0.031     0.043     0.025     0.038     0.053     0.000
0.000     0.000     0.115     0.033
       Resting Loss:     0.099     0.158     0.078     0.133     0.175     0.000
0.000     0.000     0.351     0.110
       Running Loss:     0.178     0.250     0.133     0.214     0.212     0.000
0.000     0.000     0.000     0.178
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.009
     Refueling Loss:     0.074     0.166     0.271     0.198     0.403     0.000
0.000     0.000     0.000     0.135
  Total Non-Exhaust:     0.614     0.979     0.679     0.903     1.145     0.000
0.000     0.000     0.853     0.702

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 50.0

* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 50.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2006
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
```

Weathered RVP: 9.2 psi
Fuel Sulfur Content: 33. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000 Alcohol Blend Market Share: 0.420
Ether Blend Oxygen Content: 0.000 Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.4145 | 0.3128 | 0.1369 | | 0.0377 | 0.0005 | 0.0021 | 0.0895 | 0.0060 | 1.0000 |

---

Composite Emission Factors (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 1.013 | 1.651 | 1.305 | 1.546 | 1.375 | 0.432 | 0.515 | 0.345 | 2.07 | 1.211 |
| Composite CO : | 14.57 | 20.05 | 17.48 | 19.27 | 9.76 | 1.289 | 0.897 | 1.905 | 8.43 | 15.293 |
| Composite NOX : | 0.849 | 1.377 | 1.529 | 1.423 | 4.052 | 1.207 | 1.260 | 10.100 | 1.27 | 2.059 |

---

Exhaust emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.218 | 0.372 | 0.314 | 0.354 | | 0.228 | 0.216 | | 0.384 | |
| VOC Running: | 0.211 | 0.337 | 0.331 | 0.335 | | 0.204 | 0.299 | | 0.837 | |
| VOC Total Exhaust: | 0.429 | 0.709 | 0.645 | 0.689 | 0.264 | 0.432 | 0.515 | 0.345 | 1.22 | 0.537 |
| CO Start: | 3.13 | 6.31 | 4.82 | 5.86 | | 0.742 | 0.447 | | 2.830 | |
| CO Running: | 11.43 | 13.74 | 12.66 | 13.41 | | 0.547 | 0.449 | | 5.603 | |
| CO Total Exhaust: | 14.57 | 20.05 | 17.48 | 19.27 | 9.76 | 1.289 | 0.897 | 1.905 | 8.43 | 15.293 |
| NOx Start: | 0.137 | 0.285 | 0.228 | 0.268 | | 0.066 | 0.045 | | 0.382 | |
| NOx Running: | 0.711 | 1.091 | 1.301 | 1.155 | | 1.141 | 1.216 | | 0.889 | |
| NOx Total Exhaust: | 0.849 | 1.377 | 1.529 | 1.423 | 4.052 | 1.207 | 1.260 | 10.100 | 1.27 | 2.059 |

---

Non-Exhaust Emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Hot Soak Loss: | 0.223 | 0.350 | 0.161 | 0.292 | 0.292 | 0.000 | 0.000 | 0.000 | 0.387 | 0.237 |
| Diurnal Loss: | 0.031 | 0.043 | 0.025 | 0.038 | 0.053 | 0.000 | 0.000 | 0.000 | 0.115 | 0.033 |
| Resting Loss: | 0.099 | 0.158 | 0.078 | 0.133 | 0.175 | 0.000 | 0.000 | 0.000 | 0.351 | 0.110 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Running Loss: | 0.147 | 0.213 | 0.113 | 0.183 | 0.178 | 0.000 | 0.000 | 0.000 | 0.000 | 0.150 |
| Crankcase Loss: | 0.009 | 0.012 | 0.011 | 0.012 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 |
| Refueling Loss: | 0.074 | 0.166 | 0.271 | 0.198 | 0.403 | 0.000 | 0.000 | 0.000 | 0.000 | 0.135 |
| Total Non-Exhaust: | 0.584 | 0.942 | 0.659 | 0.871 | 1.111 | 0.000 | 0.000 | 0.000 | 0.853 | 0.674 |

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```
***************************************************************************
* MOBILE6.2 (31-Oct-2002)                                                 *
* Input file: CMH09MOB.IN (file 1, run 1).                                *
***************************************************************************

* Reading Registration Distributions from the following external
* data file: COLREGS.D

* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 2.5

* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  2.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.036
                                         Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:              <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3723    0.3414    0.1493              0.0380    0.0003
0.0022    0.0907    0.0058    1.0000

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 Composite Emission Factors (g/mi):
     Composite VOC :      8.278    12.414     7.887    11.036    11.232     0.585
1.070     1.298      8.85     9.096
     Composite CO  :     39.70     47.05     41.04     45.22     46.08     3.762
2.644     8.915    106.61    40.155
     Composite NOX :      1.453     2.225     2.282     2.242     1.884     0.921
1.304    12.226      1.05     2.830

-------------------------------------------------------------------------------------
---------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.171     0.297     0.242     0.280               0.095
0.125                0.384
```

```
      VOC   Running:     1.082     2.027     1.935     1.999               0.489
0.944                7.627
  VOC Total Exhaust:     1.253     2.323     2.177     2.279     1.984     0.585
1.070     1.298      8.01     1.827

           CO Start:      2.93      5.33      4.32      5.02               0.496
0.283                2.830
         CO Running:     36.77     41.73     36.72     40.20               3.266
2.362              103.785
   CO Total Exhaust:     39.70     47.05     41.04     45.22     46.08     3.762
2.644     8.915    106.61    40.155

          NOx Start:     0.110     0.246     0.193     0.230               0.025
0.024                0.382
        NOx Running:     1.343     1.979     2.088     2.012               0.896
1.280                0.665
  NOx Total Exhaust:     1.453     2.225     2.282     2.242     1.884     0.921
1.304    12.226      1.05     2.830

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----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.184     0.306     0.138     0.255     0.264     0.000
0.000     0.000     0.394     0.206
       Diurnal Loss:     0.025     0.036     0.021     0.031     0.050     0.000
0.000     0.000     0.112     0.027
       Resting Loss:     0.079     0.132     0.065     0.112     0.147     0.000
0.000     0.000     0.330     0.092
       Running Loss:     6.686     9.478     5.285     8.202     8.484     0.000
0.000     0.000     0.000     6.836
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.042     0.127     0.189     0.146     0.292     0.000
0.000     0.000     0.000     0.098
  Total Non-Exhaust:     7.025    10.091     5.710     8.979     9.248     0.000
0.000     0.000     0.836     7.269

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 15.0

* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 15.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm
```

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000 Alcohol Blend Market Share: 0.420
Ether Blend Oxygen Content: 0.000 Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.3723 | 0.3414 | 0.1493 | | 0.0380 | 0.0003 | 0.0022 | 0.0907 | 0.0058 | 1.0000 |

Composite Emission Factors (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 1.278 | 2.045 | 1.523 | 1.886 | 2.055 | 0.366 | 0.648 | 0.719 | 3.05 | 1.564 |
| Composite CO : | 13.13 | 17.85 | 15.28 | 17.07 | 17.22 | 1.822 | 1.242 | 3.621 | 21.49 | 14.373 |
| Composite NOX : | 0.822 | 1.388 | 1.406 | 1.394 | 2.129 | 0.599 | 0.845 | 7.961 | 0.93 | 1.800 |

Exhaust emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.171 | 0.297 | 0.242 | 0.280 | | 0.095 | 0.125 | | 0.384 | |
| VOC Running: | 0.289 | 0.521 | 0.497 | 0.514 | | 0.271 | 0.523 | | 1.826 | |
| VOC Total Exhaust: | 0.459 | 0.817 | 0.739 | 0.794 | 0.708 | 0.366 | 0.648 | 0.719 | 2.21 | 0.667 |
| CO Start: | 2.93 | 5.33 | 4.32 | 5.02 | | 0.496 | 0.283 | | 2.830 | |
| CO Running: | 10.20 | 12.52 | 10.96 | 12.04 | | 1.327 | 0.959 | | 18.656 | |
| CO Total Exhaust: | 13.13 | 17.85 | 15.28 | 17.07 | 17.22 | 1.822 | 1.242 | 3.621 | 21.49 | 14.373 |
| NOx Start: | 0.110 | 0.246 | 0.193 | 0.230 | | 0.025 | 0.024 | | 0.382 | |
| NOx Running: | 0.712 | 1.142 | 1.213 | 1.164 | | 0.574 | 0.820 | | 0.552 | |
| NOx Total Exhaust: | 0.822 | 1.388 | 1.406 | 1.394 | 2.129 | 0.599 | 0.845 | 7.961 | 0.93 | 1.800 |

Non-Exhaust Emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Hot Soak Loss: | 0.184 | 0.306 | 0.138 | 0.255 | 0.264 | 0.000 | 0.000 | 0.000 | 0.394 | 0.206 |
| Diurnal Loss: | 0.025 | 0.036 | 0.021 | 0.031 | 0.050 | 0.000 | 0.000 | 0.000 | 0.112 | 0.027 |
| Resting Loss: | 0.079 | 0.132 | 0.065 | 0.112 | 0.147 | 0.000 | 0.000 | 0.000 | 0.330 | 0.092 |
| Running Loss: | 0.479 | 0.614 | 0.359 | 0.537 | 0.583 | 0.000 | 0.000 | 0.000 | 0.000 | 0.464 |
| Crankcase Loss: | 0.009 | 0.012 | 0.011 | 0.012 | 0.010 | 0.000 | | | | |

```
0.000     0.000     0.000     0.010
     Refueling Loss:     0.042     0.127     0.189     0.146     0.292     0.000
0.000     0.000     0.000     0.098
  Total Non-Exhaust:     0.818     1.227     0.784     1.115     1.347     0.000
0.000     0.000     0.836     0.897

------------------------------------------------------------------------------------
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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 25.0

* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3723    0.3414    0.1493              0.0380    0.0003
0.0022    0.0907    0.0058    1.0000

------------------------------------------------------------------------------------
----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.971     1.608     1.200     1.484     1.461    0.282
0.485     0.494      2.49     1.206
     Composite CO  :     11.24     15.64     13.31     14.93     10.03     1.288
0.855     2.161     14.01    12.174
     Composite NOX :      0.691     1.218     1.229     1.221     2.325    0.497
0.699     6.605      1.05     1.551

------------------------------------------------------------------------------------
----------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.171     0.297     0.242     0.280               0.095
```

```
0.125                0.384
      VOC   Running:     0.202     0.362     0.344     0.356               0.186
0.360                1.271
  VOC Total Exhaust:     0.372     0.658     0.587     0.636     0.374     0.282
0.485     0.494      1.66     0.521

           CO Start:      2.93      5.33      4.32      5.02               0.496
0.283                2.830
         CO Running:      8.32     10.31      8.99      9.91               0.792
0.573               11.180
   CO Total Exhaust:     11.24     15.64     13.31     14.93     10.03     1.288
0.855     2.161     14.01    12.174

          NOx Start:     0.110     0.246     0.193     0.230               0.025
0.024                0.382
        NOx Running:     0.581     0.972     1.035     0.991               0.472
0.674                0.665
  NOx Total Exhaust:     0.691     1.218     1.229     1.221     2.325     0.497
0.699     6.605      1.05     1.551

------------------------------------------------------------------------------------
----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.184     0.306     0.138     0.255     0.264     0.000
0.000     0.000     0.394     0.206
       Diurnal Loss:     0.025     0.036     0.021     0.031     0.050     0.000
0.000     0.000     0.112     0.027
       Resting Loss:     0.079     0.132     0.065     0.112     0.147     0.000
0.000     0.000     0.330     0.092
       Running Loss:     0.260     0.337     0.189     0.292     0.323     0.000
0.000     0.000     0.000     0.252
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.042     0.127     0.189     0.146     0.292     0.000
0.000     0.000     0.000     0.098
  Total Non-Exhaust:     0.599     0.950     0.614     0.865     1.087     0.000
0.000     0.000     0.836     0.685

------------------------------------------------------------------------------------
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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 30.0

* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm
```

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000
Ether Blend Oxygen Content: 0.000
Alcohol Blend Market Share: 0.420
Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.3723 | 0.3414 | 0.1493 | | 0.0380 | 0.0003 | 0.0022 | 0.0907 | 0.0058 | 1.0000 |

| Composite Emission Factors (g/mi): | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 0.911 | 1.523 | 1.141 | 1.407 | 1.321 | 0.255 | 0.434 | 0.424 | 2.33 | 1.133 |
| Composite CO : | 11.03 | 15.41 | 13.10 | 14.70 | 8.32 | 1.151 | 0.756 | 1.788 | 11.96 | 11.873 |
| Composite NOX : | 0.657 | 1.174 | 1.183 | 1.177 | 2.423 | 0.476 | 0.669 | 6.331 | 1.10 | 1.496 |

| Exhaust emissions (g/mi): | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.171 | 0.297 | 0.242 | 0.280 | | 0.095 | 0.125 | | 0.384 | |
| VOC Running: | 0.186 | 0.333 | 0.317 | 0.328 | | 0.160 | 0.308 | | 1.113 | |
| VOC Total Exhaust: | 0.357 | 0.630 | 0.559 | 0.608 | 0.289 | 0.255 | 0.434 | 0.424 | 1.50 | 0.490 |
| CO Start: | 2.93 | 5.33 | 4.32 | 5.02 | | 0.496 | 0.283 | | 2.830 | |
| CO Running: | 8.11 | 10.08 | 8.77 | 9.68 | | 0.655 | 0.474 | | 9.125 | |
| CO Total Exhaust: | 11.03 | 15.41 | 13.10 | 14.70 | 8.32 | 1.151 | 0.756 | 1.788 | 11.96 | 11.873 |
| NOx Start: | 0.110 | 0.246 | 0.193 | 0.230 | | 0.025 | 0.024 | | 0.382 | |
| NOx Running: | 0.547 | 0.928 | 0.990 | 0.947 | | 0.452 | 0.645 | | 0.722 | |
| NOx Total Exhaust: | 0.657 | 1.174 | 1.183 | 1.177 | 2.423 | 0.476 | 0.669 | 6.331 | 1.10 | 1.496 |

| Non-Exhaust Emissions (g/mi): | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Hot Soak Loss: | 0.184 | 0.306 | 0.138 | 0.255 | 0.264 | 0.000 | 0.000 | 0.000 | 0.394 | 0.206 |
| Diurnal Loss: | 0.025 | 0.036 | 0.021 | 0.031 | 0.050 | 0.000 | 0.000 | 0.000 | 0.112 | 0.027 |
| Resting Loss: | 0.079 | 0.132 | 0.065 | 0.112 | 0.147 | 0.000 | 0.000 | 0.000 | 0.330 | 0.092 |
| Running Loss: | 0.215 | 0.281 | 0.157 | 0.243 | 0.268 | 0.000 | 0.000 | 0.000 | 0.000 | 0.210 |

```
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.042     0.127     0.189     0.146     0.292     0.000
0.000     0.000     0.000     0.098
  Total Non-Exhaust:     0.554     0.894     0.582     0.815     1.032     0.000
0.000     0.000     0.836     0.642

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 35.0

* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 35.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:              <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3723    0.3414    0.1493              0.0380    0.0003
0.0022    0.0907    0.0058    1.0000

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 Composite Emission Factors (g/mi):
     Composite VOC :      0.863     1.453     1.091     1.343     1.222    0.235
0.396     0.371      2.21     1.074
     Composite CO  :     11.16     15.59     13.24     14.88      7.29     1.063
0.693     1.548     10.43    11.933
     Composite NOX :      0.638     1.156     1.164     1.158     2.521    0.472
0.663     6.276      1.15     1.479

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Exhaust emissions (g/mi):
```

```
        VOC   Start:     0.171     0.297     0.242     0.280               0.095
0.125                 0.384
      VOC   Running:     0.172     0.305     0.291     0.300               0.140
0.270                 0.989
  VOC Total Exhaust:     0.343     0.601     0.533     0.580     0.233     0.235
0.396     0.371      1.37     0.464

           CO Start:      2.93      5.33      4.32      5.02               0.496
0.283                 2.830
         CO Running:      8.23     10.26      8.92      9.86               0.567
0.410                 7.602
   CO Total Exhaust:     11.16     15.59     13.24     14.88      7.29     1.063
0.693     1.548     10.43    11.933

          NOx Start:     0.110     0.246     0.193     0.230               0.025
0.024                 0.382
        NOx Running:     0.528     0.910     0.971     0.928               0.447
0.639                 0.766
  NOx Total Exhaust:     0.638     1.156     1.164     1.158     2.521     0.472
0.663     6.276      1.15     1.479

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---------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.184     0.306     0.138     0.255     0.264     0.000
0.000     0.000     0.394     0.206
       Diurnal Loss:     0.025     0.036     0.021     0.031     0.050     0.000
0.000     0.000     0.112     0.027
       Resting Loss:     0.079     0.132     0.065     0.112     0.147     0.000
0.000     0.000     0.330     0.092
       Running Loss:     0.180     0.239     0.134     0.207     0.225     0.000
0.000     0.000     0.000     0.177
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.042     0.127     0.189     0.146     0.292     0.000
0.000     0.000     0.000     0.098
  Total Non-Exhaust:     0.519     0.852     0.558     0.778     0.989     0.000
0.000     0.000     0.836     0.610

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* # # # # # # # # # # # # # # # # # # # # # # # # # 
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 40.0

* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # # 
  M583 Warning:
            The user supplied arterial average speed of 40.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
```

```
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  No
                Evap I/M Program:  No
                     ATP Program:  No
                Reformulated Gas:  No

  Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
  Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.036
                                        Alcohol Blend RVP Waiver: Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:              <6000     >6000     (All)
                         ------   ------    ------    ------    ------    ------
------    ------    ------    ------
  VMT Distribution:    0.3723   0.3414    0.1493              0.0380    0.0003
0.0022    0.0907    0.0058    1.0000

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---------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.831     1.411     1.064     1.305     1.151    0.221
0.367     0.333      2.12     1.037
     Composite CO  :     11.76     16.32     13.89     15.58      6.74    1.009
0.654     1.402      9.37    12.463
     Composite NOX :      0.644     1.165     1.174     1.168     2.619    0.484
0.680     6.434      1.18     1.504

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---------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.171     0.297     0.242     0.280              0.095
0.125                0.384
      VOC   Running:     0.169     0.294     0.282     0.290              0.125
0.242                0.903
  VOC Total Exhaust:     0.340     0.591     0.524     0.570     0.196    0.221
0.367     0.333      1.29     0.452

           CO Start:      2.93      5.33      4.32      5.02              0.496
0.283                2.830
         CO Running:      8.83     10.99      9.57     10.56              0.514
0.371                6.544
   CO Total Exhaust:     11.76     16.32     13.89     15.58      6.74    1.009
0.654     1.402      9.37    12.463

          NOx Start:     0.110     0.246     0.193     0.230              0.025
0.024                0.382
        NOx Running:     0.533     0.919     0.981     0.938              0.459
0.656                0.796
  NOx Total Exhaust:     0.644     1.165     1.174     1.168     2.619    0.484
0.680     6.434      1.18     1.504

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---------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.184     0.306     0.138     0.255     0.264    0.000
0.000     0.000     0.394     0.206
       Diurnal Loss:     0.025     0.036     0.021     0.031     0.050    0.000
0.000     0.000     0.112     0.027
       Resting Loss:     0.079     0.132     0.065     0.112     0.147    0.000
0.000     0.000     0.330     0.092
       Running Loss:     0.152     0.207     0.115     0.179     0.191    0.000
```

```
0.000     0.000     0.000     0.152
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.042     0.127     0.189     0.146     0.292     0.000
0.000     0.000     0.000     0.098
  Total Non-Exhaust:     0.491     0.820     0.540     0.749     0.955     0.000
0.000     0.000     0.836     0.584

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 45.0

* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:  2009
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3723    0.3414    0.1493              0.0380    0.0003
0.0022    0.0907    0.0058    1.0000

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 Composite Emission Factors (g/mi):
     Composite VOC :      0.803     1.374     1.040     1.273     1.098    0.210
0.347     0.305      2.07     1.006
     Composite CO  :     12.37     17.04     14.54     16.28      6.59     0.983
0.635     1.329      8.71    13.018
     Composite NOX :      0.653     1.181     1.190     1.184     2.717    0.513
0.722     6.822      1.20     1.554

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```

```
Exhaust emissions (g/mi):
        VOC   Start:     0.171     0.297     0.242     0.280               0.095
0.125                0.384
      VOC   Running:     0.166     0.284     0.273     0.280               0.115
0.222                0.853
  VOC Total Exhaust:     0.336     0.580     0.515     0.560     0.172     0.210
0.347     0.305      1.24     0.442

           CO Start:      2.93      5.33      4.32      5.02               0.496
0.283                2.830
         CO Running:      9.44     11.72     10.22     11.26               0.487
0.352                5.876
   CO Total Exhaust:     12.37     17.04     14.54     16.28      6.59     0.983
0.635     1.329      8.71    13.018

          NOx Start:     0.110     0.246     0.193     0.230               0.025
0.024                0.382
        NOx Running:     0.543     0.935     0.996     0.954               0.489
0.698                0.819
  NOx Total Exhaust:     0.653     1.181     1.190     1.184     2.717     0.513
0.722     6.822      1.20     1.554

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----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.184     0.306     0.138     0.255     0.264     0.000
0.000     0.000     0.394     0.206
       Diurnal Loss:     0.025     0.036     0.021     0.031     0.050     0.000
0.000     0.000     0.112     0.027
       Resting Loss:     0.079     0.132     0.065     0.112     0.147     0.000
0.000     0.000     0.330     0.092
       Running Loss:     0.127     0.181     0.100     0.157     0.163     0.000
0.000     0.000     0.000     0.130
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.042     0.127     0.189     0.146     0.292     0.000
0.000     0.000     0.000     0.098
  Total Non-Exhaust:     0.466     0.794     0.525     0.726     0.926     0.000
0.000     0.000     0.836     0.563

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* # # # # # # # # # # # # # # # # # # # # # # # # # 
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 50.0

* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # 
  M583 Warning:
            The user supplied arterial average speed of 50.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                     Calendar Year:  2009
                             Month:  July
                          Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
```

Weathered RVP: 9.2 psi
Fuel Sulfur Content: 30. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000 Alcohol Blend Market Share: 0.420
Ether Blend Oxygen Content: 0.000 Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.3723 | 0.3414 | 0.1493 | | 0.0380 | 0.0003 | 0.0022 | 0.0907 | 0.0058 | 1.0000 |

| Composite Emission Factors (g/mi): | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 0.777 | 1.337 | 1.016 | 1.239 | 1.057 | 0.203 | 0.333 | 0.285 | 2.06 | 0.976 |
| Composite CO : | 12.97 | 17.77 | 15.19 | 16.99 | 6.81 | 0.979 | 0.632 | 1.319 | 8.43 | 13.595 |
| Composite NOX : | 0.662 | 1.197 | 1.205 | 1.199 | 2.815 | 0.563 | 0.793 | 7.483 | 1.27 | 1.630 |

| Exhaust emissions (g/mi): | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.171 | 0.297 | 0.242 | 0.280 | | 0.095 | 0.125 | | 0.384 | |
| VOC Running: | 0.162 | 0.273 | 0.264 | 0.270 | | 0.108 | 0.207 | | 0.837 | |
| VOC Total Exhaust: | 0.333 | 0.570 | 0.506 | 0.550 | 0.157 | 0.203 | 0.333 | 0.285 | 1.22 | 0.434 |
| CO Start: | 2.93 | 5.33 | 4.32 | 5.02 | | 0.496 | 0.283 | | 2.830 | |
| CO Running: | 10.05 | 12.44 | 10.87 | 11.97 | | 0.483 | 0.350 | | 5.603 | |
| CO Total Exhaust: | 12.97 | 17.77 | 15.19 | 16.99 | 6.81 | 0.979 | 0.632 | 1.319 | 8.43 | 13.595 |
| NOx Start: | 0.110 | 0.246 | 0.193 | 0.230 | | 0.025 | 0.024 | | 0.382 | |
| NOx Running: | 0.552 | 0.951 | 1.012 | 0.969 | | 0.538 | 0.769 | | 0.889 | |
| NOx Total Exhaust: | 0.662 | 1.197 | 1.205 | 1.199 | 2.815 | 0.563 | 0.793 | 7.483 | 1.27 | 1.630 |

| Non-Exhaust Emissions (g/mi): | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Hot Soak Loss: | 0.184 | 0.306 | 0.138 | 0.255 | 0.264 | 0.000 | 0.000 | 0.000 | 0.394 | 0.206 |
| Diurnal Loss: | 0.025 | 0.036 | 0.021 | 0.031 | 0.050 | 0.000 | 0.000 | 0.000 | 0.112 | 0.027 |
| Resting Loss: | 0.079 | 0.132 | 0.065 | 0.112 | 0.147 | 0.000 | 0.000 | 0.000 | 0.330 | 0.092 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Running Loss: | 0.105 | 0.155 | 0.085 | 0.134 | 0.136 | 0.000 | 0.000 | 0.000 | 0.000 | 0.110 |
| Crankcase Loss: | 0.009 | 0.012 | 0.011 | 0.012 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 |
| Refueling Loss: | 0.042 | 0.127 | 0.189 | 0.146 | 0.292 | 0.000 | 0.000 | 0.000 | 0.000 | 0.098 |
| Total Non-Exhaust: | 0.444 | 0.768 | 0.510 | 0.703 | 0.900 | 0.000 | 0.000 | 0.000 | 0.836 | 0.543 |

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```
****************************************************************************
* MOBILE6.2 (31-Oct-2002)                                                  *
* Input file: CMH12MOB.IN (file 1, run 1).                                 *
****************************************************************************

* Reading Registration Distributions from the following external
* data file: COLREGS.D

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 2.5

* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  2.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2012
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3394    0.3640    0.1593              0.0380    0.0003
0.0023    0.0910    0.0057    1.0000

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----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      5.808     8.376     5.981     7.647     8.566    0.317
0.734     1.066      8.84     6.447
     Composite CO  :     35.08     42.54     35.96     40.54     39.88     3.216
2.119     5.900    106.61    35.782
     Composite NOX :      1.075     1.782     1.646     1.741     1.254    0.432
0.781     8.046      1.05     2.064

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Exhaust emissions (g/mi):
```

```
        VOC   Start:     0.133     0.240     0.195     0.226               0.043
0.089               0.384
      VOC   Running:     0.808     1.549     1.508     1.536               0.274
0.645               7.627
  VOC Total Exhaust:     0.941     1.788     1.702     1.762     1.343     0.317
0.734     1.066     8.01     1.437

           CO Start:      2.62      4.60      3.76      4.34               0.391
0.223               2.830
         CO Running:     32.46     37.94     32.20     36.20               2.825
1.896             103.785
   CO Total Exhaust:     35.08     42.54     35.96     40.54     39.88     3.216
2.119     5.900   106.61    35.782

          NOx Start:     0.085     0.204     0.152     0.188               0.011
0.016               0.382
        NOx Running:     0.990     1.578     1.493     1.552               0.421
0.765               0.665
  NOx Total Exhaust:     1.075     1.782     1.646     1.741     1.254     0.432
0.781     8.046      1.05     2.064

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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.134     0.232     0.118     0.197     0.242     0.000
0.000     0.000     0.394     0.160
       Diurnal Loss:     0.018     0.027     0.017     0.024     0.036     0.000
0.000     0.000     0.111     0.020
       Resting Loss:     0.057     0.098     0.052     0.084     0.120     0.000
0.000     0.000     0.328     0.069
       Running Loss:     4.624     6.135     3.972     5.477     6.588     0.000
0.000     0.000     0.000     4.686
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000     0.065
  Total Non-Exhaust:     4.867     6.587     4.278     6.003     7.223     0.000
0.000     0.000     0.834     5.010

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* # # # # # # # # # # # # # # # # # # # # # # # # # 
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 15.0

* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # 
  M583 Warning:
            The user supplied arterial average speed of 15.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2012
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
```

Nominal Fuel RVP: 9.0 psi
Weathered RVP: 9.2 psi
Fuel Sulfur Content: 30. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000
Ether Blend Oxygen Content: 0.000

Alcohol Blend Market Share: 0.420
Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.3394 | 0.3640 | 0.1593 | | 0.0380 | 0.0003 | 0.0023 | 0.0910 | 0.0057 | 1.0000 |
| **Composite Emission Factors (g/mi):** | | | | | | | | | | |
| Composite VOC : | 0.943 | 1.503 | 1.171 | 1.402 | 1.578 | 0.195 | 0.446 | 0.590 | 3.04 | 1.186 |
| Composite CO : | 11.68 | 16.13 | 13.58 | 15.35 | 14.90 | 1.539 | 0.993 | 2.397 | 21.49 | 12.906 |
| Composite NOX : | 0.607 | 1.115 | 1.018 | 1.085 | 1.417 | 0.281 | 0.506 | 5.236 | 0.93 | 1.311 |
| **Exhaust emissions (g/mi):** | | | | | | | | | | |
| VOC Start: | 0.133 | 0.240 | 0.195 | 0.226 | | 0.043 | 0.089 | | 0.384 | |
| VOC Running: | 0.220 | 0.402 | 0.391 | 0.399 | | 0.152 | 0.357 | | 1.826 | |
| VOC Total Exhaust: | 0.353 | 0.642 | 0.586 | 0.625 | 0.479 | 0.195 | 0.446 | 0.590 | 2.21 | 0.532 |
| CO Start: | 2.62 | 4.60 | 3.76 | 4.34 | | 0.391 | 0.223 | | 2.830 | |
| CO Running: | 9.06 | 11.53 | 9.82 | 11.01 | | 1.147 | 0.770 | | 18.656 | |
| CO Total Exhaust: | 11.68 | 16.13 | 13.58 | 15.35 | 14.90 | 1.539 | 0.993 | 2.397 | 21.49 | 12.906 |
| NOx Start: | 0.085 | 0.204 | 0.152 | 0.188 | | 0.011 | 0.016 | | 0.382 | |
| NOx Running: | 0.522 | 0.911 | 0.866 | 0.897 | | 0.270 | 0.491 | | 0.552 | |
| NOx Total Exhaust: | 0.607 | 1.115 | 1.018 | 1.085 | 1.417 | 0.281 | 0.506 | 5.236 | 0.93 | 1.311 |
| **Non-Exhaust Emissions (g/mi):** | | | | | | | | | | |
| Hot Soak Loss: | 0.134 | 0.232 | 0.118 | 0.197 | 0.242 | 0.000 | 0.000 | 0.000 | 0.394 | 0.160 |
| Diurnal Loss: | 0.018 | 0.027 | 0.017 | 0.024 | 0.036 | 0.000 | 0.000 | 0.000 | 0.111 | 0.020 |
| Resting Loss: | 0.057 | 0.098 | 0.052 | 0.084 | 0.120 | 0.000 | | | | |

```
0.000     0.000     0.328     0.069
       Running Loss:     0.347     0.409     0.279     0.370     0.464     0.000
0.000     0.000     0.000     0.329
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000     0.065
  Total Non-Exhaust:     0.590     0.861     0.585     0.792     1.099     0.000
0.000     0.000     0.834     0.654

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 25.0

* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2012
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:              <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3394    0.3640    0.1593              0.0380    0.0003
0.0023    0.0910    0.0057    1.0000

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----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.713     1.189     0.914     1.106     1.142     0.148
0.335     0.406      2.49     0.916
     Composite CO  :      9.91     13.98     11.71     13.29      8.69     1.076
0.683     1.430     14.01    10.861
     Composite NOX :      0.510     0.978     0.890     0.951     1.547     0.233
```

```
0.419     4.343      1.05     1.132

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----------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.133     0.240     0.195     0.226               0.043
0.089              0.384
      VOC   Running:     0.153     0.279     0.271     0.276               0.104
0.246              1.271
  VOC Total Exhaust:     0.286     0.518     0.466     0.502     0.253     0.148
0.335     0.406      1.66     0.417

           CO Start:      2.62      4.60      3.76      4.34               0.391
0.223              2.830
         CO Running:      7.29      9.39      7.95      8.95               0.685
0.460             11.180
   CO Total Exhaust:      9.91     13.98     11.71     13.29      8.69     1.076
0.683     1.430     14.01    10.861

          NOx Start:     0.085     0.204     0.152     0.188               0.011
0.016              0.382
        NOx Running:     0.425     0.774     0.738     0.763               0.222
0.403              0.665
  NOx Total Exhaust:     0.510     0.978     0.890     0.951     1.547     0.233
0.419     4.343      1.05     1.132

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----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.134     0.232     0.118     0.197     0.242     0.000
0.000     0.000     0.394     0.160
       Diurnal Loss:     0.018     0.027     0.017     0.024     0.036     0.000
0.000     0.000     0.111     0.020
       Resting Loss:     0.057     0.098     0.052     0.084     0.120     0.000
0.000     0.000     0.328     0.069
       Running Loss:     0.184     0.219     0.142     0.195     0.254     0.000
0.000     0.000     0.000     0.175
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000     0.065
  Total Non-Exhaust:     0.427     0.671     0.449     0.615     0.888     0.000
0.000     0.000     0.834     0.499

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 30.0

* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2012
```

```
                       Month:  July
                    Altitude:  Low
         Minimum Temperature:  64.9 (F)
         Maximum Temperature:  85.3 (F)
           Absolute Humidity:   75. grains/lb
            Nominal Fuel RVP:   9.0 psi
               Weathered RVP:   9.2 psi
         Fuel Sulfur Content:   30. ppm

         Exhaust I/M Program:  No
            Evap I/M Program:  No
                 ATP Program:  No
            Reformulated Gas:  No

   Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.036
                                         Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV       MC   All Veh
               GVWR:              <6000     >6000     (All)
                         ------   ------    ------    ------    ------    ------
------    ------    ------   ------
   VMT Distribution:    0.3394   0.3640    0.1593              0.0380    0.0003
0.0023    0.0910    0.0057    1.0000

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----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.669     1.131     0.868     1.051     1.041    0.133
0.300     0.348      2.33     0.862
     Composite CO  :      9.70     13.74     11.49     13.05      7.20     0.958
0.604     1.183     11.96    10.573
     Composite NOX :      0.485     0.943     0.858     0.917     1.612    0.223
0.401     4.162      1.10     1.092

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----------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.133     0.240     0.195     0.226               0.043
0.089                0.384
      VOC   Running:     0.141     0.257     0.249     0.254               0.089
0.211                1.113
  VOC Total Exhaust:     0.274     0.496     0.444     0.480     0.196     0.133
0.300     0.348      1.50     0.393

           CO Start:      2.62      4.60      3.76      4.34               0.391
0.223                2.830
         CO Running:      7.08      9.14      7.73      8.71               0.567
0.380                9.125
   CO Total Exhaust:      9.70     13.74     11.49     13.05      7.20     0.958
0.604     1.183     11.96    10.573

          NOx Start:     0.085     0.204     0.152     0.188               0.011
0.016                0.382
        NOx Running:     0.400     0.739     0.705     0.728               0.212
0.386                0.722
  NOx Total Exhaust:     0.485     0.943     0.858     0.917     1.612     0.223
0.401     4.162      1.10     1.092

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----------------------------------
Non-Exhaust Emissions (g/mi):
```

```
      Hot Soak Loss:     0.134     0.232     0.118     0.197     0.242     0.000
0.000     0.000     0.394     0.160
       Diurnal Loss:     0.018     0.027     0.017     0.024     0.036     0.000
0.000     0.000     0.111     0.020
       Resting Loss:     0.057     0.098     0.052     0.084     0.120     0.000
0.000     0.000     0.328     0.069
       Running Loss:     0.152     0.182     0.119     0.163     0.210     0.000
0.000     0.000     0.000     0.145
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000     0.065
  Total Non-Exhaust:     0.395     0.634     0.425     0.581     0.845     0.000
0.000     0.000     0.834     0.470

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 35.0

* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 35.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2012
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3394    0.3640    0.1593              0.0380    0.0003
0.0023    0.0910    0.0057    1.0000

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 Composite Emission Factors (g/mi):
```

```
    Composite VOC :      0.634     1.083     0.831     1.006     0.969    0.122
0.274     0.305      2.21     0.820
    Composite CO  :      9.78     13.87     11.59     13.18      6.31     0.881
0.552     1.024     10.43    10.608
    Composite NOX :      0.471     0.928     0.844     0.902     1.677    0.221
0.398     4.126      1.15     1.079

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Exhaust emissions (g/mi):
        VOC   Start:     0.133     0.240     0.195     0.226               0.043
0.089               0.384
      VOC   Running:     0.131     0.236     0.229     0.234               0.078
0.185               0.989
  VOC Total Exhaust:     0.264     0.476     0.424     0.460     0.158     0.122
0.274     0.305      1.37     0.373

          CO Start:      2.62      4.60      3.76      4.34               0.391
0.223               2.830
        CO Running:      7.16      9.27      7.83      8.84               0.490
0.329               7.602
   CO Total Exhaust:      9.78     13.87     11.59     13.18      6.31     0.881
0.552     1.024     10.43    10.608

         NOx Start:     0.085     0.204     0.152     0.188               0.011
0.016               0.382
        NOx Running:     0.386     0.724     0.692     0.714               0.210
0.382               0.766
  NOx Total Exhaust:     0.471     0.928     0.844     0.902     1.677     0.221
0.398     4.126      1.15     1.079

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---------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.134     0.232     0.118     0.197     0.242     0.000
0.000     0.000     0.394     0.160
       Diurnal Loss:     0.018     0.027     0.017     0.024     0.036     0.000
0.000     0.000     0.111     0.020
       Resting Loss:     0.057     0.098     0.052     0.084     0.120     0.000
0.000     0.000     0.328     0.069
       Running Loss:     0.127     0.155     0.101     0.138     0.177     0.000
0.000     0.000     0.000     0.122
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000     0.065
  Total Non-Exhaust:     0.370     0.607     0.407     0.557     0.811     0.000
0.000     0.000     0.834     0.447

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 40.0

* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
          The user supplied arterial average speed of 40.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
```

```
            there are no sales for vehicle class HDGV8b
  M 48 Warning:
            there are no sales for vehicle class LDDT12

                  Calendar Year:  2012
                          Month:  July
                       Altitude:  Low
            Minimum Temperature:  64.9 (F)
            Maximum Temperature:  85.3 (F)
              Absolute Humidity:   75. grains/lb
               Nominal Fuel RVP:   9.0 psi
                  Weathered RVP:   9.2 psi
            Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  No
               Evap I/M Program:  No
                    ATP Program:  No
               Reformulated Gas:  No

   Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
  LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3394    0.3640    0.1593              0.0380    0.0003
0.0023    0.0910    0.0057    1.0000

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----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.611     1.056     0.811     0.981     0.916    0.114
0.254     0.273      2.12     0.793
     Composite CO  :     10.29     14.52     12.15     13.80      5.84     0.835
0.522     0.928      9.37    11.074
     Composite NOX :      0.475     0.937     0.851     0.911     1.742    0.226
0.408     4.230      1.18     1.097

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----------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.133     0.240     0.195     0.226               0.043
0.089                0.384
      VOC   Running:     0.129     0.230     0.223     0.228               0.070
0.165                0.903
  VOC Total Exhaust:     0.262     0.470     0.418     0.454     0.133     0.114
0.254     0.273      1.29     0.364

           CO Start:      2.62      4.60      3.76      4.34               0.391
0.223                2.830
         CO Running:      7.68      9.92      8.39      9.45               0.444
0.298                6.544
   CO Total Exhaust:     10.29     14.52     12.15     13.80      5.84     0.835
0.522     0.928      9.37    11.074

          NOx Start:     0.085     0.204     0.152     0.188               0.011
0.016                0.382
        NOx Running:     0.390     0.733     0.699     0.722               0.216
0.392                0.796
  NOx Total Exhaust:     0.475     0.937     0.851     0.911     1.742     0.226
```

```
0.408     4.230      1.18     1.097

------------------------------------------------------------------------------------
---------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.134     0.232     0.118     0.197     0.242     0.000
0.000     0.000     0.394     0.160
       Diurnal Loss:     0.018     0.027     0.017     0.024     0.036     0.000
0.000     0.000     0.111     0.020
       Resting Loss:     0.057     0.098     0.052     0.084     0.120     0.000
0.000     0.000     0.328     0.069
       Running Loss:     0.106     0.134     0.086     0.119     0.149     0.000
0.000     0.000     0.000     0.104
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000     0.065
  Total Non-Exhaust:     0.349     0.586     0.393     0.537     0.784     0.000
0.000     0.000     0.834     0.429

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 45.0

* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2012
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:       LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:              <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3394    0.3640    0.1593              0.0380    0.0003
```

```
0.0023    0.0910    0.0057    1.0000

------------------------------------------------------------------------------------
---------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.591     1.032     0.793     0.960     0.877    0.108
0.240     0.250      2.07    0.771
     Composite CO  :     10.81     15.16     12.71     14.42      5.71     0.812
0.506     0.880      8.71   11.560
     Composite NOX :      0.481     0.950     0.863     0.923     1.808    0.240
0.433     4.485      1.20    1.131

------------------------------------------------------------------------------------
---------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.133     0.240     0.195     0.226               0.043
0.089              0.384
      VOC   Running:     0.127     0.224     0.218     0.222               0.064
0.151              0.853
  VOC Total Exhaust:     0.260     0.464     0.413     0.448     0.116     0.108
0.240     0.250      1.24    0.358

           CO Start:      2.62      4.60      3.76      4.34               0.391
0.223              2.830
         CO Running:      8.19     10.57      8.95     10.07               0.421
0.283              5.876
   CO Total Exhaust:     10.81     15.16     12.71     14.42      5.71     0.812
0.506     0.880      8.71   11.560

          NOx Start:     0.085     0.204     0.152     0.188               0.011
0.016              0.382
        NOx Running:     0.396     0.746     0.710     0.735               0.230
0.417              0.819
  NOx Total Exhaust:     0.481     0.950     0.863     0.923     1.808     0.240
0.433     4.485      1.20    1.131

------------------------------------------------------------------------------------
---------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.134     0.232     0.118     0.197     0.242     0.000
0.000     0.000     0.394    0.160
       Diurnal Loss:     0.018     0.027     0.017     0.024     0.036     0.000
0.000     0.000     0.111    0.020
       Resting Loss:     0.057     0.098     0.052     0.084     0.120     0.000
0.000     0.000     0.328    0.069
       Running Loss:     0.087     0.117     0.075     0.104     0.126     0.000
0.000     0.000     0.000    0.089
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000    0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000    0.065
  Total Non-Exhaust:     0.330     0.569     0.381     0.521     0.760     0.000
0.000     0.000     0.834    0.413

------------------------------------------------------------------------------------
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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 50.0

* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
```

```
            The user supplied arterial average speed of 50.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2012
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                         ------   ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.3394   0.3640    0.1593              0.0380    0.0003
0.0023    0.0910    0.0057    1.0000

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----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.573     1.009     0.776     0.938     0.845    0.104
0.231     0.234      2.06     0.751
     Composite CO  :     11.33     15.81     13.27     15.04      5.90     0.809
0.504     0.873      8.43    12.067
     Composite NOX :      0.488     0.963     0.874     0.936     1.873    0.264
0.476     4.921      1.27     1.183

-------------------------------------------------------------------------------------
----------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.133     0.240     0.195     0.226               0.043
0.089                 0.384
      VOC   Running:     0.126     0.218     0.212     0.216               0.060
0.142                 0.837
  VOC Total Exhaust:     0.259     0.457     0.407     0.442     0.106     0.104
0.231     0.234      1.22     0.352

          CO Start:      2.62      4.60      3.76      4.34               0.391
0.223                 2.830
        CO Running:      8.71     11.21      9.52     10.70               0.418
0.281                 5.603
   CO Total Exhaust:    11.33     15.81     13.27     15.04      5.90     0.809
0.504     0.873      8.43    12.067
```

```
          NOx Start:     0.085     0.204     0.152     0.188               0.011
0.016               0.382
        NOx Running:     0.403     0.759     0.722     0.748               0.253
0.460               0.889
  NOx Total Exhaust:     0.488     0.963     0.874     0.936     1.873     0.264
0.476     4.921      1.27     1.183

--------------------------------------------------------------------------------------
----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.134     0.232     0.118     0.197     0.242     0.000
0.000     0.000     0.394     0.160
       Diurnal Loss:     0.018     0.027     0.017     0.024     0.036     0.000
0.000     0.000     0.111     0.020
       Resting Loss:     0.057     0.098     0.052     0.084     0.120     0.000
0.000     0.000     0.328     0.069
       Running Loss:     0.071     0.099     0.063     0.088     0.104     0.000
0.000     0.000     0.000     0.074
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.026     0.083     0.108     0.091     0.226     0.000
0.000     0.000     0.000     0.065
  Total Non-Exhaust:     0.314     0.551     0.369     0.506     0.739     0.000
0.000     0.000     0.834     0.399

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```

```
***************************************************************************
* MOBILE6.2 (31-Oct-2002)                                                 *
* Input file: CMH18MOB.IN (file 1, run 1).                                *
***************************************************************************

* Reading Registration Distributions from the following external
* data file: COLREGS.D

* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 2.5

* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  2.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2018
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.2978    0.3918    0.1714              0.0385    0.0003
0.0025    0.0922    0.0055    1.0000

------------------------------------------------------------------------------------
---------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      4.077     4.979     4.245     4.755     5.474    0.167
0.395     0.854      8.84     4.231
     Composite CO  :     28.20     36.28     32.12     35.02     37.23     2.442
1.678     2.474    106.61    30.369
     Composite NOX :      0.686     1.102     1.035     1.082     0.548    0.118
0.337     3.401      1.05     1.155

------------------------------------------------------------------------------------
---------------------------------
Exhaust emissions (g/mi):
```

```
         VOC   Start:     0.098     0.176     0.145     0.166               0.023
0.051               0.384
       VOC   Running:     0.564     1.071     1.065     1.069               0.145
0.344               7.627
  VOC Total Exhaust:     0.662     1.247     1.211     1.236     0.819     0.167
0.395     0.854      8.01     1.048

           CO Start:      2.13      3.88      3.32      3.71               0.304
0.173               2.830
         CO Running:     26.07     32.40     28.80     31.30               2.138
1.505             103.785
   CO Total Exhaust:     28.20     36.28     32.12     35.02     37.23     2.442
1.678     2.474    106.61    30.369

          NOx Start:     0.053     0.128     0.091     0.117               0.003
0.008               0.382
        NOx Running:     0.633     0.974     0.944     0.965               0.115
0.329               0.665
  NOx Total Exhaust:     0.686     1.102     1.035     1.082     0.548     0.118
0.337     3.401      1.05     1.155

------------------------------------------------------------------------------------
----------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.077     0.103     0.072     0.094     0.146     0.000
0.000     0.000     0.394     0.083
       Diurnal Loss:     0.009     0.012     0.010     0.012     0.023     0.000
0.000     0.000     0.111     0.011
       Resting Loss:     0.028     0.035     0.028     0.033     0.066     0.000
0.000     0.000     0.328     0.031
       Running Loss:     3.278     3.530     2.861     3.327     4.247     0.000
0.000     0.000     0.000     3.013
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.014     0.039     0.052     0.043     0.162     0.000
0.000     0.000     0.000     0.035
  Total Non-Exhaust:     3.415     3.732     3.034     3.557     4.654     0.000
0.000     0.000     0.834     3.183

------------------------------------------------------------------------------------
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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 15.0

* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 15.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2018
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
```

Nominal Fuel RVP: 9.0 psi
Weathered RVP: 9.2 psi
Fuel Sulfur Content: 30. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000 Alcohol Blend Market Share: 0.420
Ether Blend Oxygen Content: 0.000 Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.2978 | 0.3918 | 0.1714 | | 0.0385 | 0.0003 | 0.0025 | 0.0922 | 0.0055 | 1.0000 |
| **Composite Emission Factors (g/mi):** | | | | | | | | | | |
| Composite VOC : | 0.652 | 0.907 | 0.807 | 0.877 | 1.021 | 0.103 | 0.241 | 0.473 | 3.04 | 0.788 |
| Composite CO : | 9.34 | 13.80 | 12.15 | 13.30 | 13.91 | 1.172 | 0.784 | 1.005 | 21.49 | 11.020 |
| Composite NOX : | 0.380 | 0.687 | 0.633 | 0.670 | 0.619 | 0.077 | 0.219 | 2.201 | 0.93 | 0.723 |
| **Exhaust emissions (g/mi):** | | | | | | | | | | |
| VOC Start: | 0.098 | 0.176 | 0.145 | 0.166 | | 0.023 | 0.051 | | 0.384 | |
| VOC Running: | 0.154 | 0.280 | 0.278 | 0.279 | | 0.080 | 0.190 | | 1.826 | |
| VOC Total Exhaust: | 0.252 | 0.455 | 0.423 | 0.446 | 0.292 | 0.103 | 0.241 | 0.473 | 2.21 | 0.394 |
| CO Start: | 2.13 | 3.88 | 3.32 | 3.71 | | 0.304 | 0.173 | | 2.830 | |
| CO Running: | 7.21 | 9.92 | 8.83 | 9.59 | | 0.868 | 0.611 | | 18.656 | |
| CO Total Exhaust: | 9.34 | 13.80 | 12.15 | 13.30 | 13.91 | 1.172 | 0.784 | 1.005 | 21.49 | 11.020 |
| NOx Start: | 0.053 | 0.128 | 0.091 | 0.117 | | 0.003 | 0.008 | | 0.382 | |
| NOx Running: | 0.327 | 0.559 | 0.542 | 0.554 | | 0.074 | 0.211 | | 0.552 | |
| NOx Total Exhaust: | 0.380 | 0.687 | 0.633 | 0.670 | 0.619 | 0.077 | 0.219 | 2.201 | 0.93 | 0.723 |
| **Non-Exhaust Emissions (g/mi):** | | | | | | | | | | |
| Hot Soak Loss: | 0.077 | 0.103 | 0.072 | 0.094 | 0.146 | 0.000 | 0.000 | 0.000 | 0.394 | 0.083 |
| Diurnal Loss: | 0.009 | 0.012 | 0.010 | 0.012 | 0.023 | 0.000 | 0.000 | 0.000 | 0.111 | 0.011 |
| Resting Loss: | 0.028 | 0.035 | 0.028 | 0.033 | 0.066 | 0.000 | | | | |

```
0.000     0.000     0.328     0.031
       Running Loss:     0.263     0.250     0.211     0.238     0.321     0.000
0.000     0.000     0.000     0.225
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.014     0.039     0.052     0.043     0.162     0.000
0.000     0.000     0.000     0.035
  Total Non-Exhaust:     0.400     0.452     0.384     0.435     0.729     0.000
0.000     0.000     0.834     0.395

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 25.0

* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2018
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.2978    0.3918    0.1714              0.0385    0.0003
0.0025    0.0922    0.0055    1.0000

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----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.477     0.698     0.614     0.672     0.732    0.078
0.182     0.325      2.49     0.593
     Composite CO  :      7.82     11.81     10.38     11.37      8.11     0.822
0.538     0.600     14.01     9.178
     Composite NOX :      0.318     0.601     0.550     0.585     0.676    0.064
```

```
0.181     1.820      1.05     0.624

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Exhaust emissions (g/mi):
        VOC   Start:     0.098     0.176     0.145     0.166               0.023
0.051                0.384
      VOC   Running:     0.107     0.194     0.192     0.193               0.055
0.131                1.271
  VOC Total Exhaust:     0.205     0.369     0.337     0.359     0.154     0.078
0.182     0.325      1.66     0.309

           CO Start:      2.13      3.88      3.32      3.71               0.304
0.173                2.830
         CO Running:      5.69      7.92      7.06      7.66               0.518
0.365               11.180
   CO Total Exhaust:      7.82     11.81     10.38     11.37      8.11     0.822
0.538     0.600     14.01     9.178

          NOx Start:     0.053     0.128     0.091     0.117               0.003
0.008                0.382
        NOx Running:     0.265     0.473     0.459     0.469               0.060
0.173                0.665
  NOx Total Exhaust:     0.318     0.601     0.550     0.585     0.676     0.064
0.181     1.820      1.05     0.624

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---------------------------------
Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.077     0.103     0.072     0.094     0.146     0.000
0.000     0.000     0.394     0.083
       Diurnal Loss:     0.009     0.012     0.010     0.012     0.023     0.000
0.000     0.000     0.111     0.011
       Resting Loss:     0.028     0.035     0.028     0.033     0.066     0.000
0.000     0.000     0.328     0.031
       Running Loss:     0.135     0.127     0.103     0.119     0.170     0.000
0.000     0.000     0.000     0.114
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.014     0.039     0.052     0.043     0.162     0.000
0.000     0.000     0.000     0.035
  Total Non-Exhaust:     0.273     0.328     0.276     0.316     0.577     0.000
0.000     0.000     0.834     0.284

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 30.0

* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2018
```

```
                       Month:  July
                    Altitude:  Low
         Minimum Temperature:  64.9 (F)
         Maximum Temperature:  85.3 (F)
           Absolute Humidity:   75. grains/lb
            Nominal Fuel RVP:   9.0 psi
               Weathered RVP:   9.2 psi
         Fuel Sulfur Content:   30. ppm

         Exhaust I/M Program:  No
            Evap I/M Program:  No
                 ATP Program:  No
            Reformulated Gas:  No

   Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.036
                                         Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                          ------  ------    ------    ------    ------    ------
------    ------    ------   ------
   VMT Distribution:    0.2978   0.3918    0.1714              0.0385    0.0003
0.0025    0.0922    0.0055    1.0000

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----------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.445     0.660     0.580     0.636     0.667    0.070
0.163     0.279      2.33     0.555
     Composite CO  :      7.62     11.55     10.16     11.13      6.72     0.733
0.475     0.496     11.96     8.908
     Composite NOX :      0.301     0.579     0.529     0.564     0.705    0.061
0.173     1.743      1.10     0.601

-------------------------------------------------------------------------------------
----------------------------------
Exhaust emissions (g/mi):
        VOC   Start:     0.098     0.176     0.145     0.166               0.023
0.051                 0.384
      VOC   Running:     0.098     0.178     0.176     0.177               0.047
0.112                 1.113
  VOC Total Exhaust:     0.196     0.353     0.322     0.344     0.119     0.070
0.163     0.279      1.50     0.291

           CO Start:      2.13      3.88      3.32      3.71               0.304
0.173                 2.830
         CO Running:      5.49      7.67      6.84      7.42               0.429
0.302                 9.125
   CO Total Exhaust:      7.62     11.55     10.16     11.13      6.72     0.733
0.475     0.496     11.96     8.908

          NOx Start:     0.053     0.128     0.091     0.117               0.003
0.008                 0.382
        NOx Running:     0.248     0.451     0.438     0.447               0.058
0.166                 0.722
  NOx Total Exhaust:     0.301     0.579     0.529     0.564     0.705     0.061
0.173     1.743      1.10     0.601

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Non-Exhaust Emissions (g/mi):
```

```
      Hot Soak Loss:     0.077     0.103     0.072     0.094     0.146     0.000
0.000     0.000     0.394     0.083
       Diurnal Loss:     0.009     0.012     0.010     0.012     0.023     0.000
0.000     0.000     0.111     0.011
       Resting Loss:     0.028     0.035     0.028     0.033     0.066     0.000
0.000     0.000     0.328     0.031
       Running Loss:     0.112     0.105     0.086     0.099     0.140     0.000
0.000     0.000     0.000     0.095
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.014     0.039     0.052     0.043     0.162     0.000
0.000     0.000     0.000     0.035
  Total Non-Exhaust:     0.249     0.307     0.259     0.295     0.548     0.000
0.000     0.000     0.834     0.264

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 35.0

* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 35.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2018
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.2978    0.3918    0.1714              0.0385    0.0003
0.0025    0.0922    0.0055    1.0000

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 Composite Emission Factors (g/mi):
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    Composite VOC :      0.419     0.632     0.554     0.608     0.621    0.064
0.149    0.244     2.21    0.526
    Composite CO  :      7.66     11.62     10.23     11.20      5.89    0.675
0.434    0.429    10.43    8.911
    Composite NOX :      0.292     0.570     0.520     0.555     0.733    0.060
0.172    1.727     1.15    0.594

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Exhaust emissions (g/mi):
       VOC   Start:     0.098     0.176     0.145     0.166               0.023
0.051              0.384
     VOC   Running:     0.091     0.165     0.163     0.164               0.041
0.098              0.989
  VOC Total Exhaust:    0.189     0.340     0.308     0.331     0.096     0.064
0.149    0.244     1.37    0.277

          CO Start:      2.13      3.88      3.32      3.71               0.304
0.173              2.830
        CO Running:      5.53      7.74      6.91      7.49               0.371
0.261              7.602
   CO Total Exhaust:     7.66     11.62     10.23     11.20      5.89     0.675
0.434    0.429    10.43    8.911

         NOx Start:     0.053     0.128     0.091     0.117               0.003
0.008              0.382
       NOx Running:     0.239     0.442     0.429     0.438               0.057
0.164              0.766
  NOx Total Exhaust:    0.292     0.570     0.520     0.555     0.733     0.060
0.172    1.727     1.15    0.594

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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:    0.077     0.103     0.072     0.094     0.146     0.000
0.000    0.000    0.394    0.083
       Diurnal Loss:    0.009     0.012     0.010     0.012     0.023     0.000
0.000    0.000    0.111    0.011
       Resting Loss:    0.028     0.035     0.028     0.033     0.066     0.000
0.000    0.000    0.328    0.031
       Running Loss:    0.092     0.089     0.073     0.084     0.117     0.000
0.000    0.000    0.000    0.079
     Crankcase Loss:    0.009     0.012     0.011     0.012     0.010     0.000
0.000    0.000    0.000    0.010
     Refueling Loss:    0.014     0.039     0.052     0.043     0.162     0.000
0.000    0.000    0.000    0.035
  Total Non-Exhaust:    0.230     0.291     0.246     0.280     0.524     0.000
0.000    0.000    0.834    0.249

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 40.0

* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
           The user supplied arterial average speed of 40.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
  M 48 Warning:
```

```
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2018
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                Reformulated Gas:  No

   Ether Blend Market Share: 0.000      Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000    Alcohol Blend Oxygen Content: 0.036
                                         Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
  LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
 ------    ------    ------    ------
   VMT Distribution:    0.2978    0.3918    0.1714              0.0385    0.0003
 0.0025    0.0922    0.0055    1.0000

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  Composite Emission Factors (g/mi):
      Composite VOC :      0.401     0.616     0.540     0.593     0.586    0.060
 0.139     0.219      2.12     0.508
      Composite CO  :      8.04     12.14     10.71     11.70      5.45     0.640
 0.410     0.389      9.37     9.283
      Composite NOX :      0.294     0.575     0.525     0.560     0.762    0.062
 0.176     1.771      1.18     0.603

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 Exhaust emissions (g/mi):
         VOC   Start:     0.098     0.176     0.145     0.166              0.023
 0.051                0.384
       VOC   Running:     0.090     0.162     0.160     0.161              0.037
 0.088                0.903
   VOC Total Exhaust:     0.188     0.338     0.305     0.328     0.081    0.060
 0.139     0.219      1.29     0.271

            CO Start:      2.13      3.88      3.32      3.71              0.304
 0.173                2.830
          CO Running:      5.91      8.25      7.40      7.99              0.336
 0.237                6.544
    CO Total Exhaust:      8.04     12.14     10.71     11.70      5.45    0.640
 0.410     0.389      9.37     9.283

           NOx Start:     0.053     0.128     0.091     0.117              0.003
 0.008                0.382
         NOx Running:     0.241     0.448     0.434     0.444              0.059
 0.169                0.796
   NOx Total Exhaust:     0.294     0.575     0.525     0.560     0.762    0.062
```

```
0.176     1.771      1.18     0.603

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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.077     0.103     0.072     0.094     0.146     0.000
0.000     0.000     0.394     0.083
       Diurnal Loss:     0.009     0.012     0.010     0.012     0.023     0.000
0.000     0.000     0.111     0.011
       Resting Loss:     0.028     0.035     0.028     0.033     0.066     0.000
0.000     0.000     0.328     0.031
       Running Loss:     0.076     0.077     0.062     0.072     0.097     0.000
0.000     0.000     0.000     0.067
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.014     0.039     0.052     0.043     0.162     0.000
0.000     0.000     0.000     0.035
  Total Non-Exhaust:     0.213     0.278     0.235     0.268     0.505     0.000
0.000     0.000     0.834     0.237

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* # # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 45.0

* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b
  M 48 Warning:
              there are no sales for vehicle class LDDT12

                    Calendar Year:  2018
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  64.9 (F)
              Maximum Temperature:  85.3 (F)
                Absolute Humidity:   75. grains/lb
                 Nominal Fuel RVP:   9.0 psi
                    Weathered RVP:   9.2 psi
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  No
                 Evap I/M Program:  No
                      ATP Program:  No
                 Reformulated Gas:  No

   Ether Blend Market Share: 0.000       Alcohol Blend Market Share: 0.420
   Ether Blend Oxygen Content: 0.000     Alcohol Blend Oxygen Content: 0.036
                                          Alcohol Blend RVP Waiver: Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV
 LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------
------    ------    ------    ------
   VMT Distribution:    0.2978    0.3918    0.1714              0.0385    0.0003
```

0.0025    0.0922    0.0055    1.0000

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 Composite Emission Factors (g/mi):
     Composite VOC :      0.386     0.603     0.528     0.580     0.559    0.057
0.132     0.200      2.07     0.493
     Composite CO  :      8.42      12.66     11.20     12.21     5.33     0.623
0.397     0.369      8.71     9.674
     Composite NOX :      0.298     0.584     0.533     0.569     0.791    0.066
0.187     1.881      1.20     0.620

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Exhaust emissions (g/mi):
        VOC   Start:     0.098     0.176     0.145     0.166               0.023
0.051                0.384
      VOC   Running:     0.089     0.159     0.157     0.159               0.034
0.081                0.853
  VOC Total Exhaust:     0.187     0.335     0.302     0.325     0.071     0.057
0.132     0.200      1.24     0.267

          CO Start:      2.13      3.88      3.32      3.71                0.304
0.173                2.830
        CO Running:      6.29      8.77      7.88      8.50                0.319
0.224                5.876
   CO Total Exhaust:     8.42      12.66     11.20     12.21      5.33     0.623
0.397     0.369      8.71     9.674

         NOx Start:     0.053     0.128     0.091     0.117               0.003
0.008                0.382
       NOx Running:     0.245     0.456     0.442     0.452               0.063
0.179                0.819
  NOx Total Exhaust:     0.298     0.584     0.533     0.569     0.791     0.066
0.187     1.881      1.20     0.620

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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.077     0.103     0.072     0.094     0.146     0.000
0.000     0.000     0.394     0.083
       Diurnal Loss:     0.009     0.012     0.010     0.012     0.023     0.000
0.000     0.000     0.111     0.011
       Resting Loss:     0.028     0.035     0.028     0.033     0.066     0.000
0.000     0.000     0.328     0.031
       Running Loss:     0.061     0.066     0.053     0.062     0.080     0.000
0.000     0.000     0.000     0.056
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.014     0.039     0.052     0.043     0.162     0.000
0.000     0.000     0.000     0.035
  Total Non-Exhaust:     0.199     0.268     0.226     0.258     0.488     0.000
0.000     0.000     0.834     0.226

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* # # # # # # # # # # # # # # # # # # # # # # # # #
* COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 50.0

* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:

The user supplied arterial average speed of 50.0
will be used for all hours of the day. 100% of VMT
has been assigned to the arterial/collector roadway
type for all hours of the day and all vehicle types.

M 48 Warning:
there are no sales for vehicle class HDGV8b

M 48 Warning:
there are no sales for vehicle class LDDT12

Calendar Year: 2018
Month: July
Altitude: Low
Minimum Temperature: 64.9 (F)
Maximum Temperature: 85.3 (F)
Absolute Humidity: 75. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 9.2 psi
Fuel Sulfur Content: 30. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: No

Ether Blend Market Share: 0.000
Ether Blend Oxygen Content: 0.000

Alcohol Blend Market Share: 0.420
Alcohol Blend Oxygen Content: 0.036
Alcohol Blend RVP Waiver: Yes

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.2978 | 0.3918 | 0.1714 | | 0.0385 | 0.0003 | 0.0025 | 0.0922 | 0.0055 | 1.0000 |

Composite Emission Factors (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 0.373 | 0.590 | 0.517 | 0.568 | 0.538 | 0.055 | 0.126 | 0.188 | 2.06 | 0.480 |
| Composite CO : | 8.80 | 13.18 | 11.69 | 12.73 | 5.50 | 0.620 | 0.396 | 0.366 | 8.43 | 10.082 |
| Composite NOX : | 0.302 | 0.593 | 0.541 | 0.577 | 0.819 | 0.072 | 0.205 | 2.067 | 1.27 | 0.645 |

Exhaust emissions (g/mi):

| | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.098 | 0.176 | 0.145 | 0.166 | | 0.023 | 0.051 | | 0.384 | |
| VOC Running: | 0.088 | 0.157 | 0.154 | 0.156 | | 0.032 | 0.076 | | 0.837 | |
| VOC Total Exhaust: | 0.186 | 0.332 | 0.299 | 0.322 | 0.065 | 0.055 | 0.126 | 0.188 | 1.22 | 0.264 |
| CO Start: | 2.13 | 3.88 | 3.32 | 3.71 | | 0.304 | 0.173 | | 2.830 | |
| CO Running: | 6.67 | 9.30 | 8.37 | 9.02 | | 0.316 | 0.223 | | 5.603 | |
| CO Total Exhaust: | 8.80 | 13.18 | 11.69 | 12.73 | 5.50 | 0.620 | 0.396 | 0.366 | 8.43 | 10.082 |

```
          NOx Start:     0.053     0.128     0.091     0.117               0.003
0.008                0.382
        NOx Running:     0.249     0.465     0.450     0.460               0.069
0.198                0.889
  NOx Total Exhaust:     0.302     0.593     0.541     0.577     0.819     0.072
0.205     2.067      1.27     0.645

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Non-Exhaust Emissions (g/mi):
      Hot Soak Loss:     0.077     0.103     0.072     0.094     0.146     0.000
0.000     0.000     0.394     0.083
       Diurnal Loss:     0.009     0.012     0.010     0.012     0.023     0.000
0.000     0.000     0.111     0.011
       Resting Loss:     0.028     0.035     0.028     0.033     0.066     0.000
0.000     0.000     0.328     0.031
       Running Loss:     0.049     0.056     0.045     0.052     0.065     0.000
0.000     0.000     0.000     0.047
     Crankcase Loss:     0.009     0.012     0.011     0.012     0.010     0.000
0.000     0.000     0.000     0.010
     Refueling Loss:     0.014     0.039     0.052     0.043     0.162     0.000
0.000     0.000     0.000     0.035
  Total Non-Exhaust:     0.186     0.258     0.218     0.248     0.473     0.000
0.000     0.000     0.834     0.217

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