

**MOVES Task Force**

**September 15, 2009  
10:00 AM – 12:00 Noon  
MWCOG, Room 1**

1. Call to Order/Introductions  
Co-Chairs, Diane Franks, MDE, and Jim Ponticello, VDOT ..... 5 minutes
2. Review of August 18<sup>th</sup> Meeting Highlights  
Co-Chairs ..... 5 minutes
3. MOVES Model Testing Work Program and Schedule  
COG Staff ..... 30 minutes
4. Review of Sensitivity Test Results To Date  
COG Staff ..... 20 minutes
5. Review of MOVES Model Inputs  
Group ..... 30 minutes
6. Jurisdictional Inputs on I/M and Fuel Program  
State Air Agencies ..... 20 minutes
7. Next Meeting/Agenda Items  
Co-Chairs ..... 5 minutes
8. Other Business  
Co-Chairs ..... 5 minutes

**MOVES TASK FORCE**  
September 15, 2009 Meeting

Agenda Item3:  
MOVES Model Testing: Work Plan and Schedule  
Presentation Materials

1. Overview	Attachment 1
2. Context	
Existing approach	Attachment 2
Geography	“ 3
Flowchart	“ 4
Outline of specific, existing processes	“ 5
3. Model Tests using Default Values and Local Data	“ 6
4. Discussion of Schedule	

### MOVES Work Plan – Overview

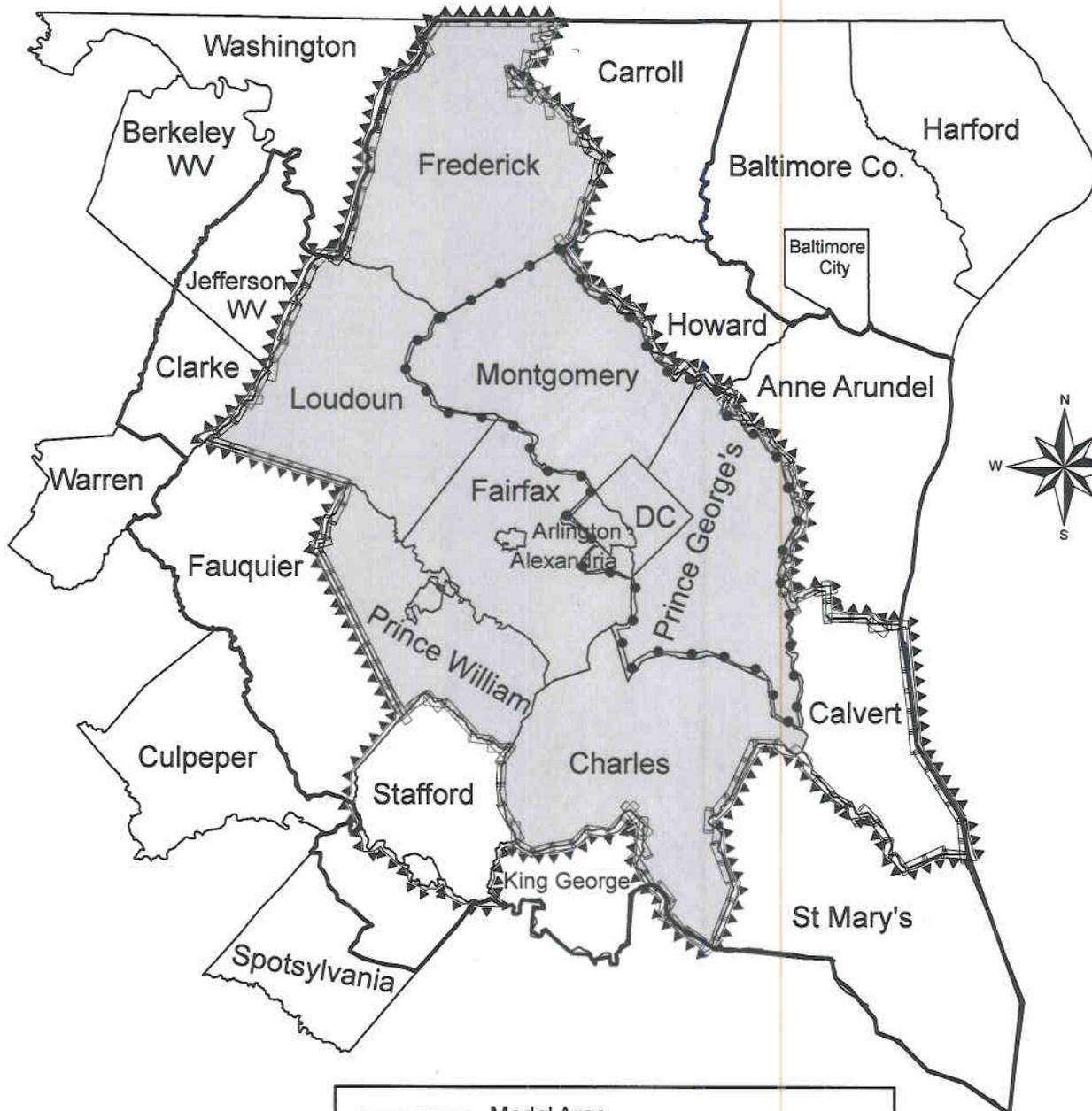
1. Establish technical work group to review MOVES model and inputs and to provide guidance to staff.
2. Test MOVES model and different modeling approaches using national default values, and compare outputs for each pollutant with results previously obtained using Mobile6 / mobile source emissions post-processor.
3. Develop MOVES inputs using local data.
4. Execute model using local data; evaluate sensitivity of each input; and compare to above results from MOVES national default data and from Mobile6.
5. Research and test the ability of MOVES to accommodate elements of COG's existing disaggregate mobile source emissions modeling approach.
6. Identify optimal approach for use of MOVES in Washington area (domain, level of aggregation of inputs / outputs).
7. Consider drafting comments to provide feedback to EPA on model applications work.

## EXHIBIT 1

## Analysis Structure for On-Road Mobile Source Emissions

	<u>Transportation Component</u>	X	<u>Emission Factor</u>	=	<u>Emissions</u>
A. Network	1. Trip origins		Cold start rate (g/trip)		Startup
	2. VMT		Stabilized rate (g/mile)		Running
	3. Trip destinations		Hot soak (g/trip)		Hot soak
B. Off-Network	4. Number of vehicles (gasoline fueled)		Diurnal rate (g/day)		Diurnal evaporation
	5. Number of vehicles (gasoline fueled)		Resting loss (g/day)		Resting loss
	6. Auto access to transit		Travel components (above)		Startup, running, hot soak
	7. School & transit bus VMT		(HDDV) Stabilized rate (g/mile)		Running
	8. Local Road VMT		Stabilized Rate (g/mile)		Running

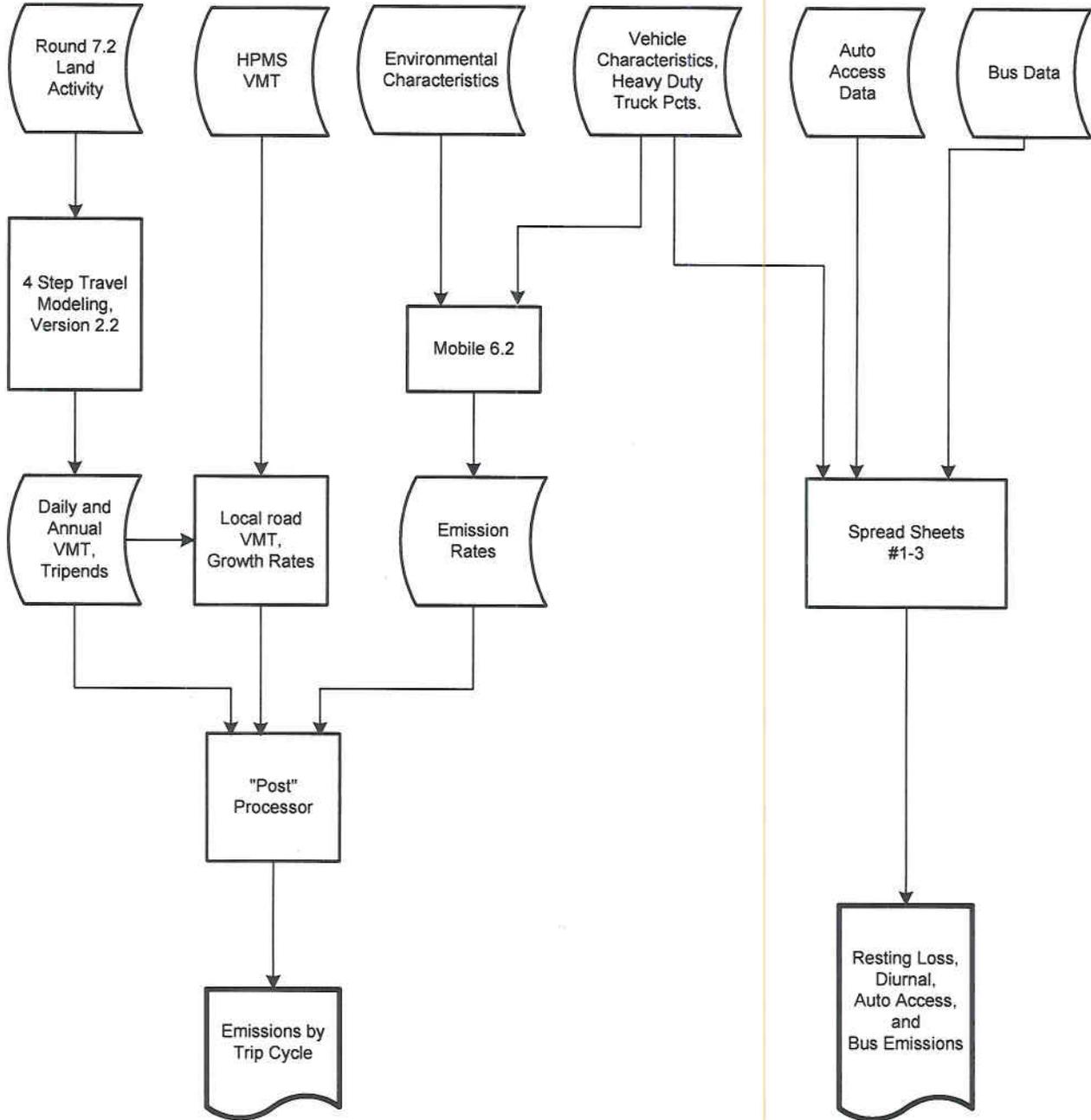
# EXHIBIT 2 Washington, D.C. - Maryland - Virginia Planning Areas



	Model Area
	1-Hour Ozone Nonattainment Area
	8-Hour Ozone Nonattainment Area
	PM <sub>2.5</sub> Nonattainment Area
	Winter CO Maintenance Area

# EXHIBIT 3

## ON-ROAD MOBILE SOURCE EMISSIONS CALCULATIONS



C10EXH3.VSD

**'CONTEXT' – Existing Mobile Source Emissions Estimation Process**

**(Mobile6 Rates by Trip Cycle and Emissions Post-Processor / Spreadsheets)**

**I. 1-Hour Ozone: VOC and NO<sub>x</sub> as precursors**

- A. Geography – 1983 MSA
- B. Parameters – daily ozone season: VMT, temp, humidity, fuel, evaluation month
- C. Output emissions rates:
  - 1. VOC - individual rates based upon:
    - a. Network VMT mix and travel speeds: start, running, soak, diurnal and resting loss emissions
    - b. Local roads VMT mix and travel speeds: running emissions
    - c. Transit bus VMT mix and operating speeds: running
    - d. School bus VMT mix and operating speeds: running
    - e. Auto access VMT mix (commuter vehicles): start, running, and soaks
  - 2. NO<sub>x</sub>
    - a. Network VMT mix and travel speeds: start and running emissions
    - b. As above
    - c. As above
    - d. As above
    - e. Auto access: start and running

**II. 8-Hour Ozone**

- A. Geography – 1-hour area less Stafford
- B. As above
- C. As above

**III. Winter Carbon Monoxide**

- A. Geography – historic
- B. Parameters – daily winter season: VMT, temp, humidity, fuel, evaluation month
- C. Output emissions rates:
  - 1. CO
    - f. Network VMT mix and travel speeds: start, running emissions
    - g. Local roads VMT mix and travel speeds: running emissions
    - h. Transit bus VMT mix and operating speeds: running
    - i. School bus VMT mix and operating speeds: running
    - j. Auto access VMT mix (commuter vehicles): start, running

**IV. PM<sub>2.5</sub>**

- A. Geography – 1983 MSA less Stafford and Calvert counties
- B. Parameters – annual averages / totals: VMT, temp, humidity, fuel, evaluation month

C. Output emissions rates:

1. Direct PM<sub>2.5</sub>

- f. Network VMT mix and travel speeds: start, running, soak, diurnal and resting loss emissions
- g. Local roads VMT mix and travel speeds: running emissions
- h. Transit bus VMT mix and operating speeds: running
- i. School bus VMT mix and operating speeds: running
- j. Auto access VMT mix (commuter vehicles): start, running, and soaks

2. Precursor NO<sub>x</sub>

- k. Network VMT mix and travel speeds: start, running, soak, diurnal and resting loss emissions
- l. Local roads VMT mix and travel speeds: running emissions
- m. Transit bus VMT mix and operating speeds: running
- n. School bus VMT mix and operating speeds: running
- o. Auto access VMT mix (commuter vehicles): start, running, and soaks

V. **Greenhouse Gases**

A. Geography – 8-hour ozone area

B. Parameters –annual averages / totals: VMT, temp, humidity, fuel, evaluation month

C. Output emissions rates for CO<sub>2</sub> and CO<sub>2e</sub>:

- p. Network VMT mix: total emissions
- q. Local roads VMT mix: total emissions
- r. Transit bus VMT mix: total
- s. School bus VMT mix: total
- t. Auto access VMT mix (commuter vehicles): total emissions

**MOVES MODEL TESTING****I. Test Model using Default Values: 2005 and 2030**

- Apply MOVES at 'county' level using national default data
- For initial tests, execute with 3 jurisdictions (DC, Mtg, and Fax) to obtain:
  - Daily: VOC, NO<sub>x</sub> for ozone season, CO for winter season
  - Annual: PM 2.5, precursor NO<sub>x</sub>, CO<sub>2</sub>
- Document any differences in scope of analysis (e.g., MOVES does not yet include motorcycles), and compare with Mobile6: absolute emissions for each year and changes through time for each pollutant
- If time allows, execute for all jurisdictions for each pollutant's nonattainment area
- Execute process as a regional domain and as a 'custom domain' and compare results with Mobile6 and with individual jurisdiction results, if available (emissions and running times for modeling)

**II. Test Model using Local Data: 2005 and 2030**

- As local data are developed from EPA 'importers' and through local conversion efforts, introduce each element to see the resulting change in emissions
- Continue testing, based upon results from Task I, using either 3 illustrative jurisdictions, regional domain, or for each jurisdiction:
  - Fuel characteristics
  - Met data
  - I/M programs
  - Vehicle age
  - Vehicle types
  - VMT by HPMS vehicle types
  - VMT fractions by vehicle type by MOVES road types
- Using default results as a base, compare results of model testing and present to task Force, with recommendations as to structure of model applications for the Washing area
- Compare results using local datasets entirely

**III. To the Extent Feasible, Test MOVES at Disaggregate Level**

- Similar to COG's existing procedures, apply by trip cycle
- Apply for different VMT mixes, e.g., at network versus local
- Apply by transit, school and auto access modes
- Compare results with those previously obtained with Mobile6

**IV. Summarize Results of Model Testing and Present to Task Force**

- Document technical procedures executed in the course of testing the model
- Compare and contrast results obtained for each pollutant for each test
- Include recommendations as to structure of model application in Washington area

## V. Schedule

- Discuss at September 15<sup>th</sup> Task Force meeting
- Consider time frame to execute
- Provide feedback to EPA in sufficient time to support their model refinement and release

September 15, 2009

Comparison of MOBILE62 with MOVES for 2005 and 2030 for: The District of Columbia, Montgomery and Fairfax Counties:

**MOBILE6.2 Emissions are based on the following inputs:**

MWCOG Travel Demand Model Version 2.2

COG's COOP Round 7.2 forecasts

Mobile Rates:

2008 Vehicle Registration Data

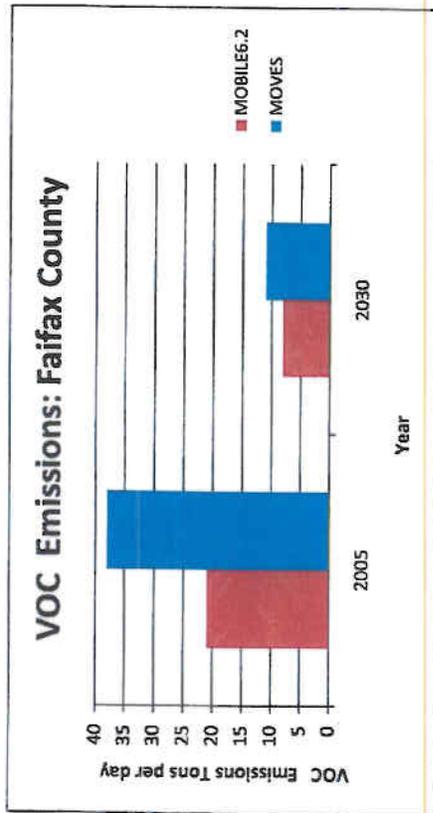
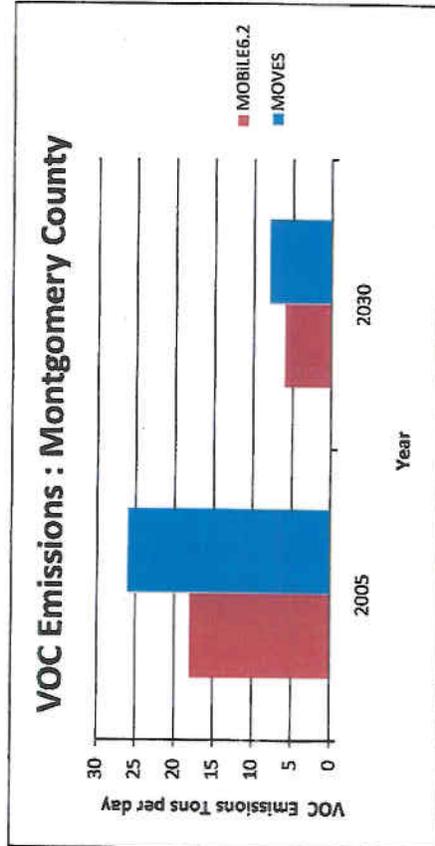
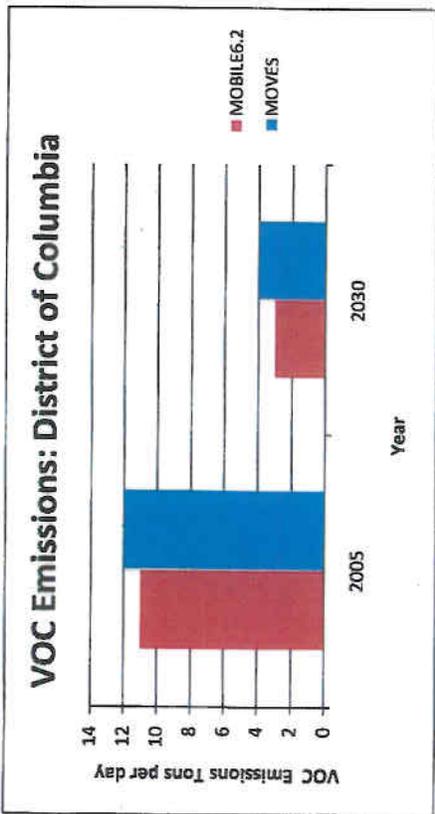
2005 emissions were interpolated using 2002 and 2010 as data points.

**MOVES Draft Emissions**

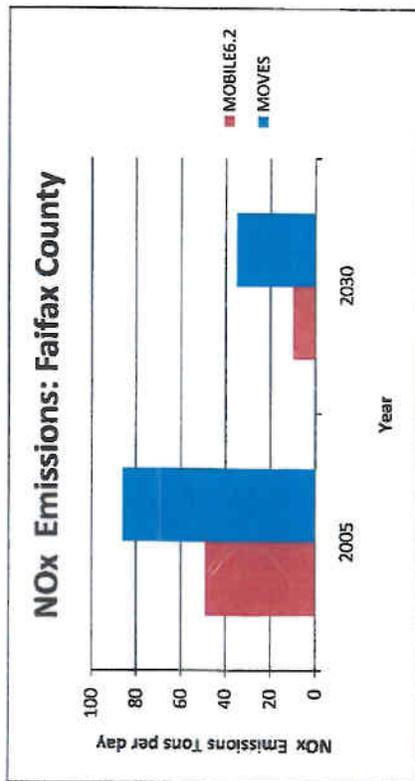
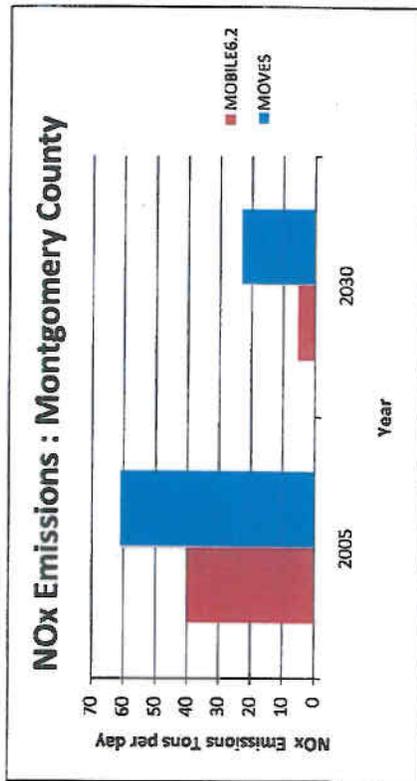
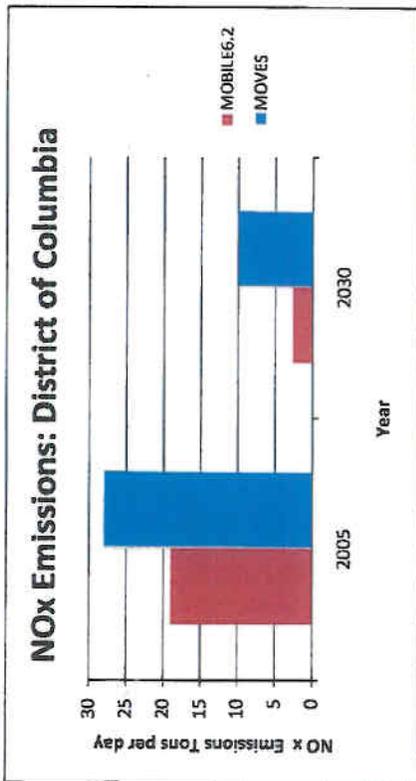
Emissions were calculated using national defaults.

Graphs are attached in the following order

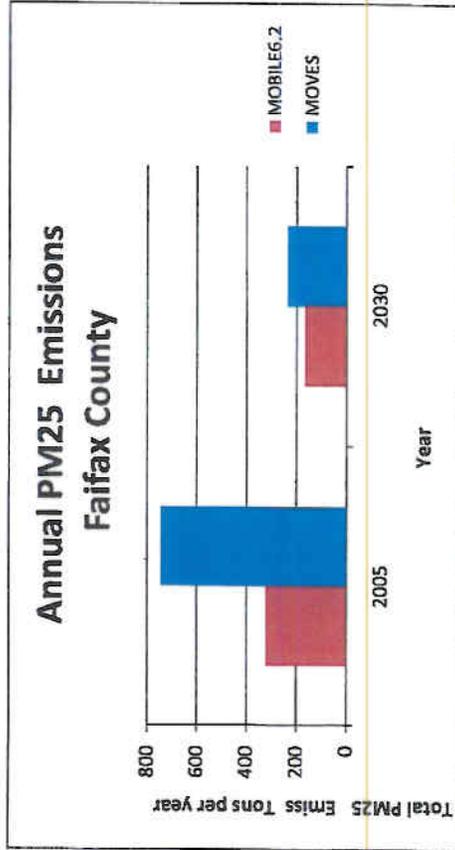
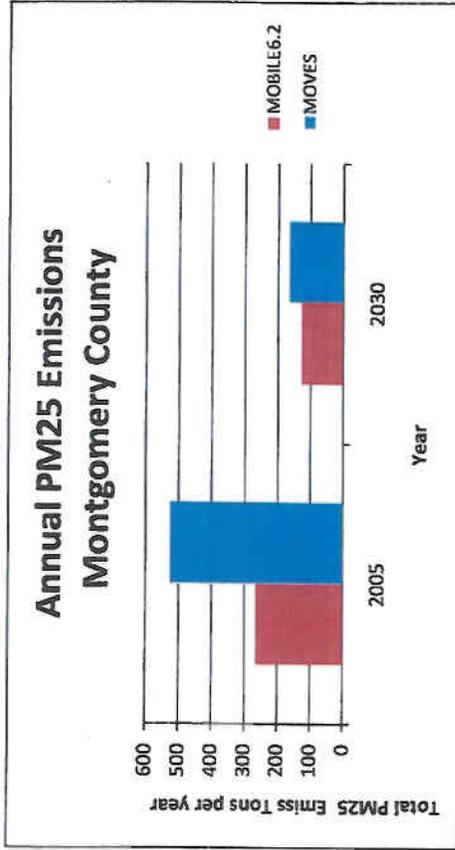
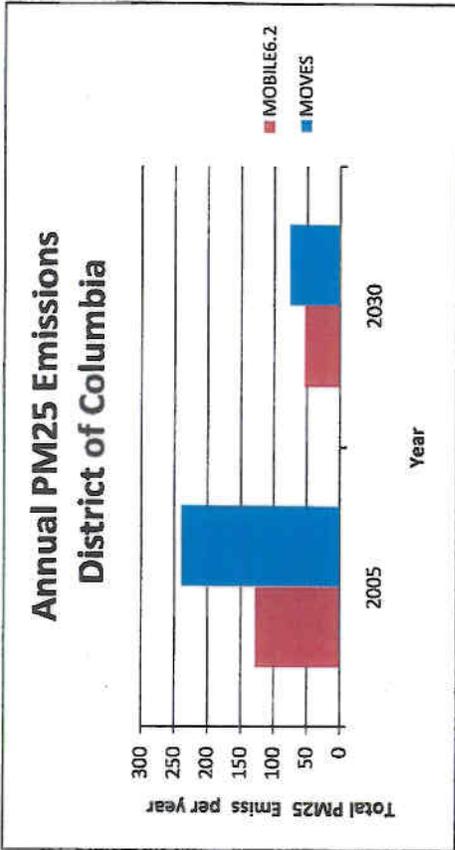
- (1) Ozone precursors VOC and NO<sub>x</sub> in tons per day
- (2) Annual Emissions: Total PM<sub>2.5</sub>, NO<sub>x</sub> and CO<sub>2</sub>



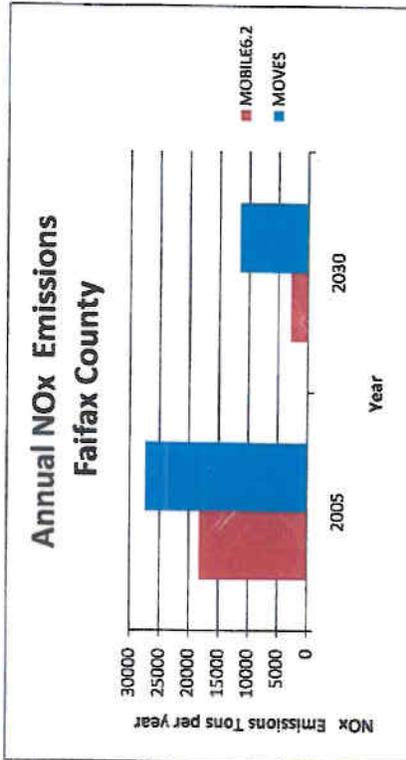
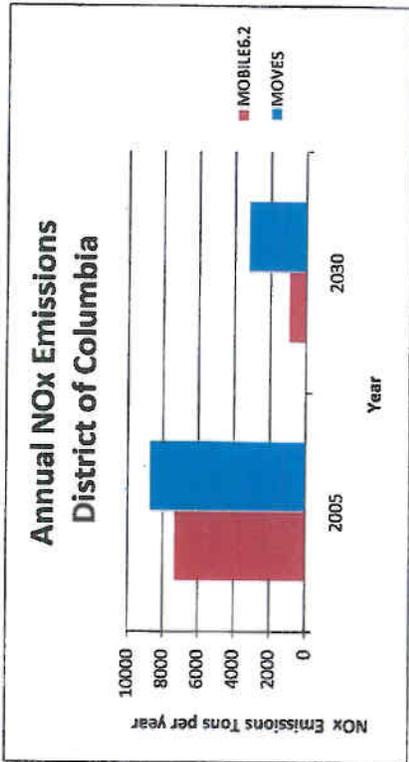
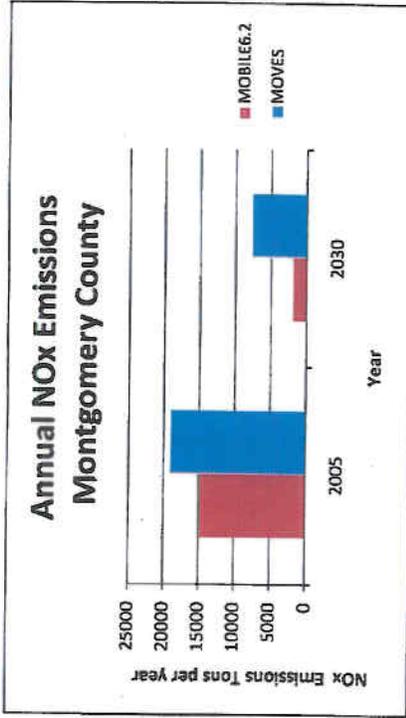
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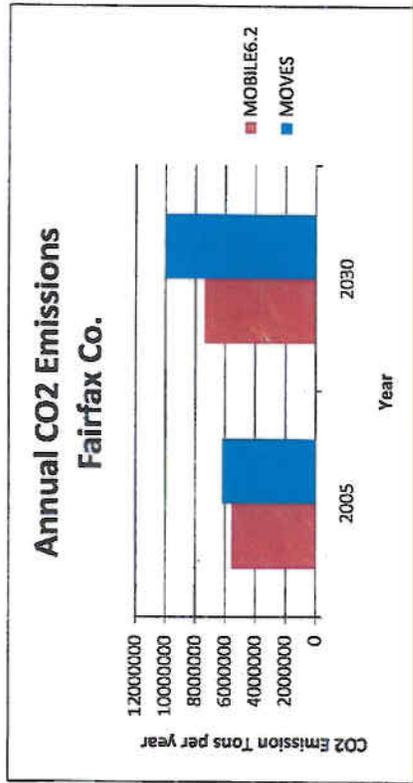
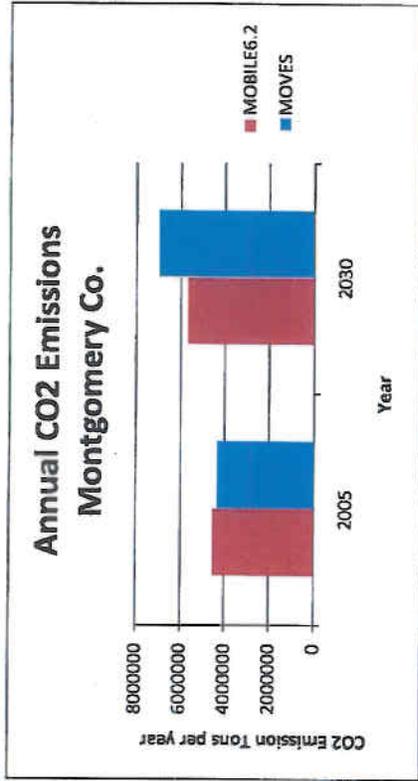
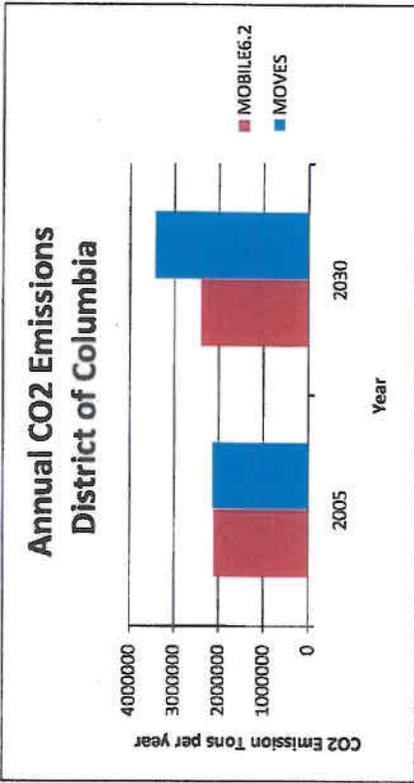
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