

NMIM Training Part 2 Fleet and Retrofit

Harvey Michaels, OTAQ

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Fleet and Retrofit Policy and Guidance

- “Diesel Retrofits: Quantifying and Using Their Benefits in SIPs and Conformity, Guidance for State and Local Air and Transportation Agencies”
<http://www.epa.gov/otaq/stateresources/transconf/policy/420b06005.pdf>
- EPA’s transportation conformity web page:
<http://www.epa.gov/otaq/stateresources/transconf/policy.htm>

“Fleet-Wide” and “Fleet-Specific”

- “Fleet-wide:” a normal NMIM run
 - Activity is defined by the BaseYearVMT table or the NONROAD Model.
 - Includes all vehicles/equipment of a particular type in the county
- “Fleet-specific:” a run performed using NMIM’s “Fleet” feature
 - Number and type of vehicles/equipment defined by user-supplied “Fleet Information File”

Fleet and Retrofit in NMIM

- The emissions from a fleet can be modeled with or without retrofits
- Retrofits can be applied either fleet-wide or fleet-specific

Fleet-wide vs. Fleet-specific retrofit projects

- Fleet-wide projects:
 - Projects for which the actual number of vehicles and their activity is not precisely known
 - E.g., wide availability of a low emission diesel fuel
 - Use just the retrofit parameters file
- Fleet-specific projects:
 - Projects for which the number of vehicles and their activity are known
 - E.g, a school district retrofits 100 school buses
 - Use both the retrofit parameter and fleet information parameter files

NMIM input files for fleet and retrofit functions

- Fleet Information File (FIF)
 - Separate onroad and nonroad files
 - Describe the specific fleet (vehicle class, number, activity)
- Retrofit Parameters File (RPF)
 - Separate onroad and nonroad files
 - Describe the retrofit project (pollutants, effectiveness, implementation dates)

Fleet—How It Works

- Select “Perform Onroad Fleet Modeling” or “Perform Nonroad Fleet Modeling”
- Specify the fleet in an external Fleet Information File (FIF)
 - Vehicles/Equipment
 - Model years
 - Activity
- NMIM post-processes MOBILE6 and/or NONROAD by-model-year output files.
- The fleet is assumed to exist in a single county.
- A retrofit program can be applied to a fleet.

Fleet - Onroad FIF (4 fields)

- MOBILE6 Vehicle Class Name
- Model Year
- Number of vehicles
- Annual VMT per vehicle
- (For more details see NMIM User's Guide)

Onroad Fleet Bugs

- If one M6 vehicle class is included in the fleet, all M6 vehicle classes associated with the NMIM vehicle class must be included in the FIF.
 - Set number and VMT to zero
 - Does not need to be the same model year
 - See handout “Potential Problems Running NMIM 2005”
- Use for heavy-duty onroad fleet only—LD problem just discovered.
- Lots of warning messages, some meaningless, but they won't prevent the model running.

Fleet Information File (FIF): 30 Transit Buses

```
# Fleet of 30 Transit Buses
MOBILE6 Vehicle Class Name, Model Year, Number of
  Vehicles, Average Annual Mileage
HDDBT,2000,15,45000
HDDBT,2001,10,45000
HDDBT,2003,5,45000
HDDBS,1995,0,0
```

- First non-comment line ignored
- Last line must not be blank
- Comments OK -- begin with #
- Last line is a dummy entry for school buses to avoid onroad modeling bug

Exercise: Bus Fleet

- Create a text file in
c:\nmim\nmim20060310\Runspecs
- Name it BusFleet.fif
- Open it with notepad
- Make entries using format on previous slide
- Make sure appropriate MOBILE6 vehicle classes are specified.

Exercise: Bus Fleet (cont)

- Create RunSpec
- Check FIF
- Fill in the rest of the RunSpec
- Try running it
- Check for errors – Action, NMIM Run Error Log
- Look at results using MySQL Query Browser.

Diesel Retrofit—How It Works

- User specifies the retrofit program in external Retrofit Parameters File (RPF)
 - Pollutant
 - Vehicles/equipment
 - Model year
 - Percent of fleet retrofit,
 - Percent effectiveness
- NMIM post-processes MOBILE6 and/or NONROAD by-model-year output files.
- Retrofit program applies to all county-months in the NMIM run.

Retrofit - Onroad RPF (9 fields)

- Program Index (set to 1)
- Pollutant—must follow M6 pollutant set
- Vehicle Class—must follow M6 28
- Initial, Final CY of retrofit implementation
- Initial, Final MY to which retrofit applied
- Percent Retrofit/Year
- Retrofit Effectiveness Percent
- (For more details see NMIM User's Guide)

Onroad Retrofit Bugs

- For each M6 vehicle class in the RPF, the corresponding NMIM vehicle class must also be specified in NMIM's Vehicles/Equipment, Onroad selection screen
 - See handout "Potential Problems Running NMIM 2005" for x-walk between NMIM and M6 vehicle classes
- Lots of warning messages, some meaningless, but they won't prevent the model running.

Retrofit Parameters File: Transit Bus Retrofit

```
# Transit Bus Retrofit  
Retrofit Program Index, Pollutant, Vehicle  
Class, Retrofit CY Begin, Retrofit CY End,  
MY Begin, MY End, %Retrofit/Year, Retrofit  
Effectiveness %  
1, hc, HDDBT,2007,2007,2000,2003,100,50
```

- First non-comment line ignored
- Last line must not be blank
- Comments OK -- begin with #

Exercise: Transit Bus Retrofit

- Create a text file in
c:\nmim\nmim20060310\Runspecs
- Name it BusFleet.rpf
- Open in Notepad
- Enter retrofit parameters

Exercise: Transit Bus Retrofit (cont)

- Check RPF
- Fill in the rest of the RunSpec
- Try running it
- Check for errors – Action, NMIM Run Error Log
- Look at results using MySQL Query Browser.

Fleet - Nonroad FIF

- Line 1 – 6 fields
 - SCC – 10 digit only
 - HP Bin expressed as HPmax: 0, 1, 3, 6, 11, 16, 25, 40, 50, 75, 100, 175, 300, 600, 750, 1000, 1200, 2000, 3000, 9999. (HPbeg < x <= HPend)
 - Model Year
 - Tech Type – “All” OK
 - Population - Number of pieces of equipment
 - Activity – hours per year (“Default” OK)
- Line 2 – 12 monthly activity fractions.
“DEFAULT” OK

Nonroad Fleet Bug

- If you specify hours/year and specify month(s) with zero allocation, those month(s) will have non-zero emissions.
- Bug does not occur if you specify “default” for either activity or allocation.
- Workarounds:
 - 1. Ignore monthly emissions which have an allocation of zero in the FIF
 - 2. In the NMIM “Time” panel, don’t select months which have an allocation of zero in the FIF.

Nonroad Fleet Bugs

- Must select the fleet equipment in Vehicles/Equipment, Nonroad
 - OK to select all – only fleet will be modeled
- The NONROAD Model must have non-zero population and activity for the equipment in your fleet.
- Lots of warning messages, some meaningless, but they won't prevent the model running.

Nonroad FIF: 30 diesel pavers

```
SCC, HPmax, ModelYear, TechType, Population, Hours/Year  
Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec  
2270002003, 300, 2000, ALL, 15, DEFAULT  
DEFAULT  
2270002003, 300, 2001, ALL, 10, 1000  
DEFAULT  
2270002003, 300, 2003, ALL, 5, 1000  
0.05,0.05,0.05,0.10,0.10,0.125,0.125,0.10,0.10,0.20,0.0,0.0
```

- Every SCC has two lines
- First two non-comment lines ignored
- Last line must not be blank
- Comments begin with #

Exercise: 30 diesel pavers

- Create a text file in
c:\nmim\nmim20060310\Runspecs
- Name it DiesPavers.fif
- Open in Notepad
- Enter a couple lines using format on previous slide
- Make sure desired Fuel/Segment combination in Vehicles/Equipment, Nonroad is specified.

Exercise: 30 diesel pavers (cont)

- “Check Fleet Information File Now”
- Fill in the rest of the RunSpec
- Try running it
- Check for errors – Action, NMIM Run Error Log
- Look at results using MySQL Query Browser.

Diesel Nonroad Retrofit Parameters File (RPF) has 12 fields

- Program Index (set to 1)
- Pollutant—must be HC, CO, NOx, or PM
- SCC—10 digit, 7 or 4 digit padded with zeroes
- Beginning of HP Range, End of HP Range
- Tech type or All
- Initial, Final, CY of retrofit implementation
- Initial, Final MY to which retrofit applied
- Percent Retrofit/Year
- Retrofit Effectiveness Percent
- (For more details see NMIM User's Guide)

RPF: Diesel Pavers

```
# Retrofit Diesel Pavers
RETROFIT Program Index, Pollutant, SCC, HPmin, HPmax,
TechType, Retrofit CY Begin, Retrofit CY End, MYbegin,
MYend, Percent Retrofitted, Percent Effectiveness
1,NOx,2270002003,75,300, ALL,2007,2007,1996,2006,100,50
```

- First non-comment line ignored (header)
- Last line must not be blank
- Comments begin with #

Nonroad Retrofit Bugs

- Lots of warning messages, some meaningless, but they won't prevent the model running.

Exercise: Retrofit Diesel Pavers

- Create a text file in
c:\nmim\nmim20060310\Runspecs
- Name it DiesPavers.RPF
- Open with notepad
- Enter parameters using format on previous slide
- Make sure desired Fuel/Segment combination in Vehicles/Equipment, Nonroad is specified.

Exercise: Retrofit Diesel Pavers (cont)

- Check RPF
- Fill in the rest of the RunSpec
- Try running it
- Check for errors – Action, NMIM Run Error Log
- Look at results using MySQL Query Browser.