NMIM Training

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International Emission Inventory Conference

New Orleans, Louisiana

May 15, 2006

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Course Objectives

- In this course, you will learn how to
  - Install NMIM (Done—Congratulations!)
  - Run NMIM from the GUI
  - View and post-process output
  - Edit, save, and modify Run Specifications
  - Run a Retrofit program
  - Simulate a Fleet
  - Edit, save, and modify Aggregation Specifications
  - Modify/customize the NMIM County Database

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Course Objectives (cont.)

- Along the way, you will learn a little about how NMIM works
- Because NMIM is a little complicated and not idiot proof, you need to understand a little of how it works in order to troubleshoot it and look at its output critically.

Other topics, if time

- Whatever you would like
- Run NMIM from the command line
- Configure NMIM
- Read NMIM's diagnostic output
- Look at the SharedWork Folder
- Run NMIM standalone and in distributed modes

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Logistics

- Hours: 8:00 AM - 12:00 PM
- One break
- Please turn off or set pagers and cell phones on vibrate
- If you need to talk on your cell phone, please leave the room.

Logisitics (cont.)

- For the hands-on exercises, I'll explain how to do it, then you do it, then I'll do it.
  - So pay attention rather than typing along.
  - Work together – you'll learn more.
  - If you finish an exercise, please help others who are having trouble.
  - Ask questions if you get stuck.
  - I'll be here for the rest of the week.

Expected Preparation

- Software installed
- Basic familiarity with the Windows operating system
  - How to start a command prompt
  - How to use Window Explorer
- How to use Notepad or another text editor
- Some familiarity with MOBILE6 and NONROAD

Questions

- Feel free to ask at any time--if you are confused, so are other people
- The answer may be
  - I'll cover that later
  - I don't know
  - Out of the scope

Miscellaneous

- NMIM has bugs, some known.
  - See Handout “Potential Problems Running NMIM 2005”
  - See “NMIM User’s Guide” on Help Menu
- I have run NMIM mostly to generate national monthly inventories for NEI and EPA rulemaking.
- I have also provided telephone support to people producing inventories for States and RPOs so I’m familiar with the kind of difficulties people run into.

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Miscellaneous (cont.)

Download latest software and database:
http://www.epa.gov/otaq/models.htm

- Important: subscribe to the mobile listserver to learn about updates, bugs, fixes in NMIM, MOBILE, and NONROAD: all are important.
- Most of what I said would be fixed last year has been fixed.
- We won't be able to cover everything
- I'll be around for the rest of the week
- You can ask questions by phone or email

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Resources

- Handouts—These Slides
- The NMIM User Guide is in the Help menu of the NMIM GUI
- NMIMDocumentation folder on installation disk or download
  - 420r05024.pdf — How NMIM Works
  - nmim_technical_memorandum_1104.pdf—Instructions for updating the NCD
  - VMT_Fractions.pdf — How to map the 8 M5 vehicle classes to the 28 M6 Vehicle Classes
- Readme folder in C:\mysql\data\NCD20060201—Database documentation
  - CountyDB.doc - Lists of tables and fields
  - CountyDB.pdf, CountyDB1.pdf – NCD Design Diagrams
  - CountyDB2.pdf – NMIM output database design diagram
  - NCD20060201Documentation.doc – Information about this version of the NCD
  - changelog.wpd – a running record of how the NCD has changed over time
- MOBILE listserver
- Email mobile@epa.gov

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Changes Since Last Year

- Upgrade to Java 1.4 and MySQL 4
- Upgrade to NONROAD2005
- Linear interpolation between existing VMT years
- Retrofit Modeling
- Fleet Modeling
- See Handout “Potential Problems Running NMIM 2005”

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State of the software

- The most reliable functions are those we have used to produce the inventories we have generated for NEI, rulemaking.
- Post-Processing/Aggregate and Export menu
  - NIF3 production worked at state level for 2002 NEI
  - Questionable for very large databases—better off writing MySQL scripts
- Still being changed and developed
  - Interested in suggestions—may end up in MOVES
  - Still think our main use-case is NEI and EPA rulemaking
- Not idiot-proof—it helps to understand how it works
- See handout “Potential Problems Running NMIM 2005”

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What is NMIM?

- The **N**ational **M**obile **I**nventory **M**odel
  - a consolidated emissions modeling system for MOBILE6 and NONROAD
- Main use case:
  - national county-level inventories for the National Emission Inventory (NEI) and for rulemaking
- Combines a Java™ framework with MOBILE, NONROAD, and a national county database.
- Capable of stand-alone or distributed processing.

What NMIM is not

- a complete GUI front-end for MOBILE and NONROAD.
- a replacement for MOBILE or NONROAD.
- a substitute for the complete reworking of MOBILE and NONROAD that is taking place in MOVES.

NMIM County Database (NCD)

- Single consistent data source
- Hourly temperatures, relative humidity (real and 30-year averages)
- Fuel properties, altitude, barometric pressure, stage 2, VMT, VMT monthly allocation, etc.
- References to MOBILE and NONROAD external files
- ExternalFiles folder
- Updated with state inputs

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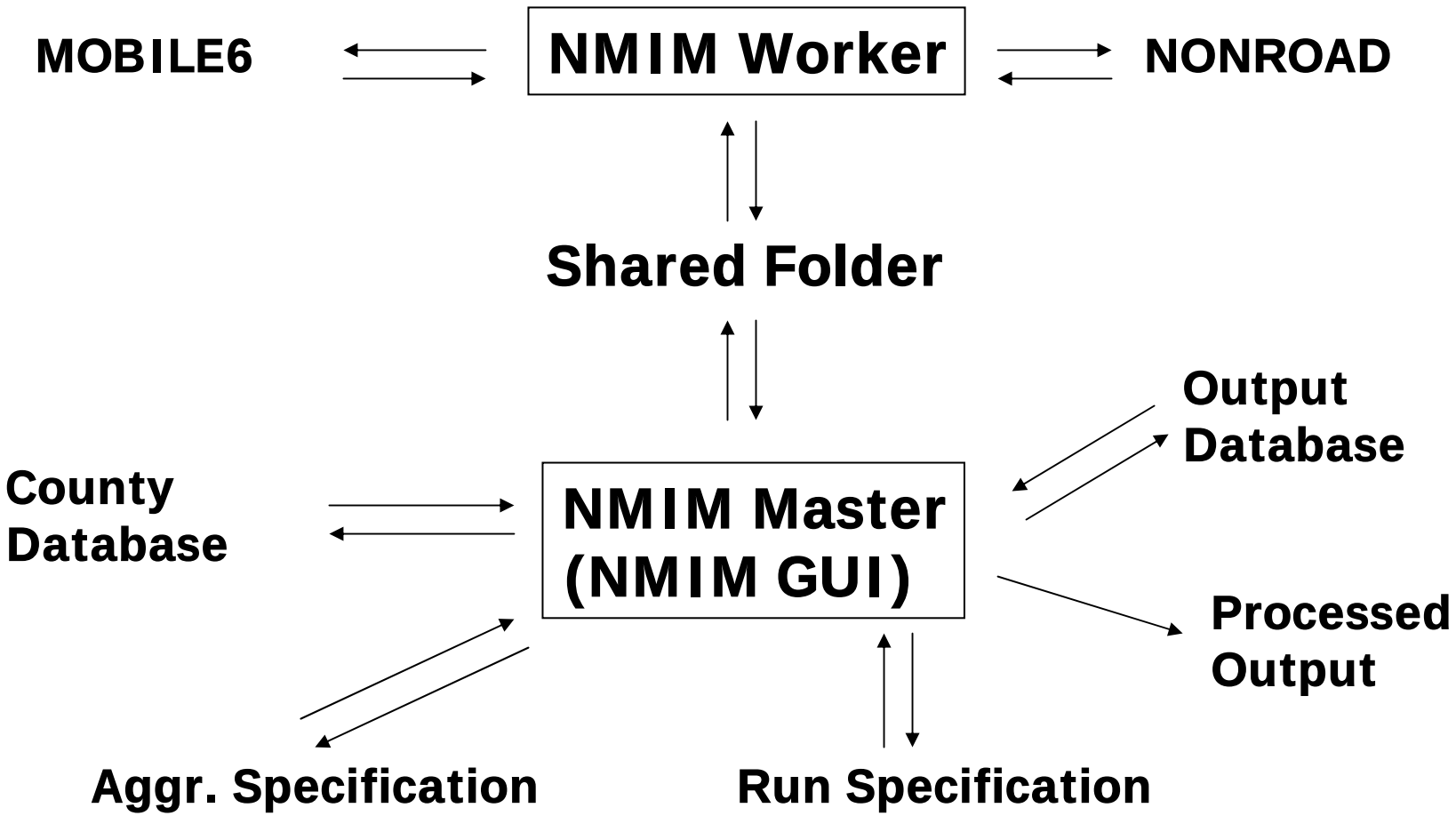
NCD Warnings

- **Don’t run an onroad inventory for years after 2002 unless you supply VMT.**
  - 2050=2002 VMT, and all years in between.
- See NCD20060201Documentation.doc in C:\mysql\data\NCD20060201\Readme
- Much State-supplied data has not been vetted

How NMIM Works



There are Three NMIM Configuration Files

- NMIMConfiguration.txt
  - Default NCD
  - Path to SharedWork folder
- WorkerConfiguration.txt
  - Paths to MOBILE and NONROAD
  - Path to SharedWork folder
- Setenv.bat
  - Paths to Java & its libraries

Exercise 1: Start Master and Worker Using Icons

- Start the Master and Worker using the desktop icons.
  - Notice the console window associated with each.
- Stop the Master and Worker.
  - Note that console window closed.

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Exercise 2: Create, Save, and Reload a RunSpec

- Start Master
- Description - Enter a brief description (optional)
  - This description will appear only in the RunSpec.
  - Do not use the five XML reserved characters: ‘ “ < > &
- Geography – experiment with different options, but select one county
- Time – experiment with this screen, then select 2002, click Add, check July
- Vehicles/Equipment
  - Experiment, then select:
  - Onroad - select LDGV
  - Offroad - select Diesel Construction

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Exercise 2: RunSpec (cont.)

- Pollutants – Experiment, then select NOx, HC as VOC
- Advanced – Important to define your input database
  - County Database Server: localhost
  - Database: NCD20060201
- Output
  - Geographic Representation - Select County
  - General Output - name database test1
- Save RunSpec -
  - Suggestion: Make a directory: RunSpecs
  - Suggested RunSpec name: test1.nrs
- Close RunSpec (File,Close)
- Reload RunSpec (File, Open)—are your saved choices still there?

Exercise 3: Execute

- Select “Action” from top-level menu
- Click Execute
- Start Worker
- Run is complete when navigation list returns
- Select Action, NMIM Run Error Log—any errors?

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Exercise 4: Where is the output?

(Introduction to NMIM's MySQL databases.)

- Open MySQL Query Browser, a handy utility for examining MySQL databases.
- Find your output database: test1
- What are the four tables?
  - How many records are in each table?
  - What are the fields of each table?
- Look at nmimpollutantoutput by double clicking on it. Note cryptic SCCID, PollutantcodeId and EmissionTypeId
- Look at nmimvmtoutput

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Exercise 5: Post Processing, normalized (1 poll./line)

- Select “Post Processing” from top-level menu.
- Click Aggregate and Export
- Choose Database Test1
- Choose Output Format: NMIM native, normalized
- Choose Output: Tab-Delimited ASCII Text File, Path: Test1Native.txt
- View using Excel. Note that cryptic fields have been decoded.

Exercise 6: Post Processing wide (all polls. on each line)

- Try Output Format: Wide Tables
- Choose Output: Tab-Delimited ASCII Text File, name output\Test1Wide.txt
- Save AgSpec: suggested name: test1Wide.nas
- View using Excel
- Overwrites, does not append
- Bug: wide doesn't decode EmissionTypeId. (1 exh, 2 evap, 3 tire, 4 brak, 5 refueling)
- Reload AgSpec.

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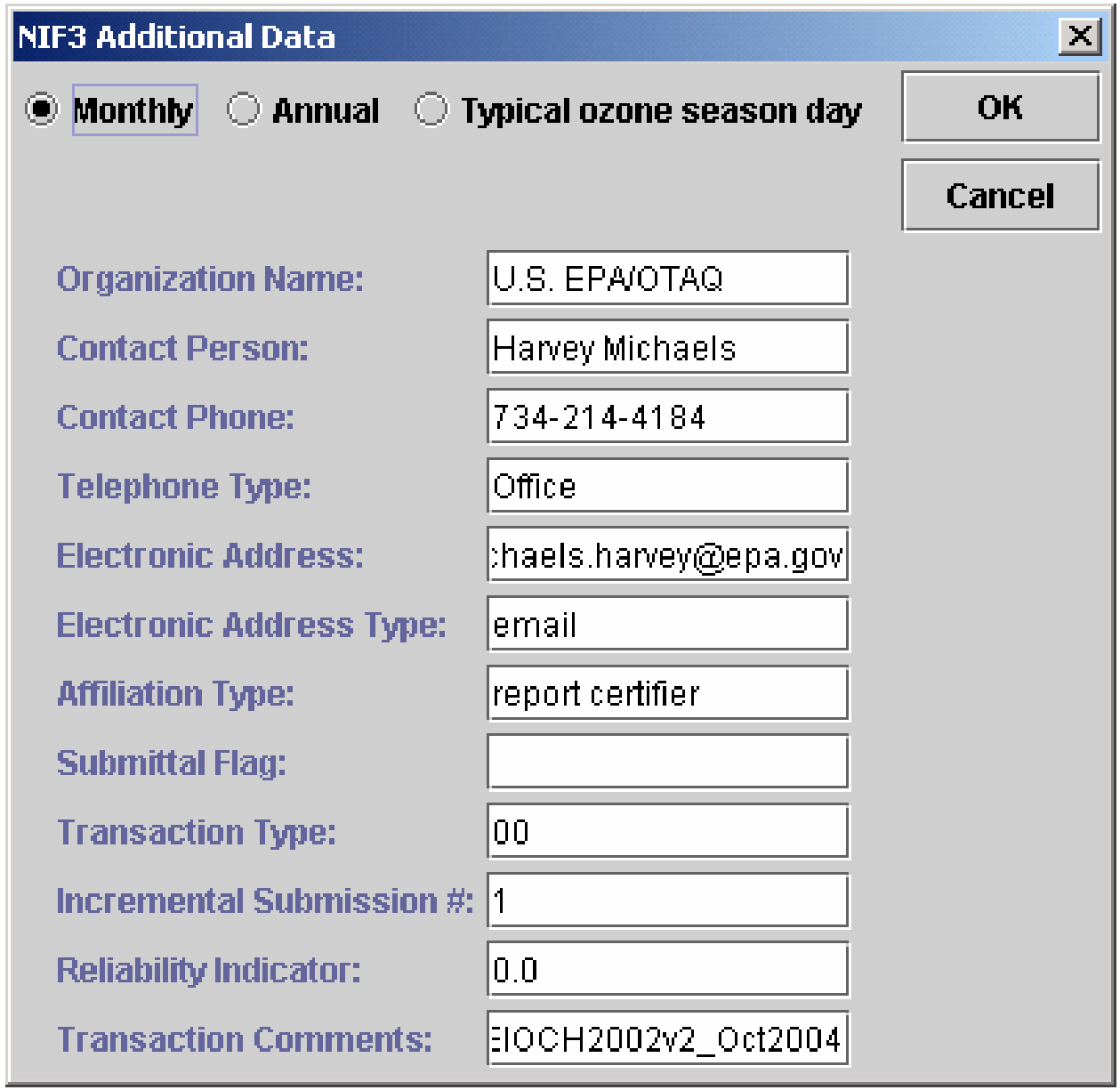
Exercise 7: Post Processing NIF3

- Try Output Format: NIF3
- Click “Get Additional Data” --Fill in
- (See sample on next slide)

Exercise 7 (cont.):



Exercise 7: NIF3 (cont.)

- Fill in NIF3 directory as NIF3test1
- Save as test1NIF3.nas
- Click OK
- Look at NIF3 output using Notepad (or other text editor)
  - Note 3 on-road, 4 NR, 4 refueling files
- Overwrites, does not append

Help Menu

- "About" will tell you your version of the software.
- NMIM User's Guide
  - You can print individual sections.
  - Sections will print better if you go to C:\nmim\nmim20060310\help\userguide and print the Word or HTML documents from there
  - No, we don't have a stand-alone document.

Diesel Retrofit—How It Works

- User specifies the retrofit program in external Retrofit Parameters File (RPF)
  - ASCII
  - Comma-delimited
- NMIM post-processes MOBILE6 and/or NONROAD by-model-year output files.
- Retrofit program applies to all county-months in the NMIM run.
- What you get from NMIM is the age distribution in the analysis year.

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)

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Retrofit - Onroad RPF: Sample

```
# Test file
Retrofit Program Index, Pollutant, Vehicle
Class, Retrofit CY Begin, Retrofit CY End,
MY Begin, MY End, %Retrofit/Year, Retrofit
Effectiveness %
1, hc, HDDV8b,2007,2010,1994,1996,20,34
1, hc, HDDV8a,2007,2010,1994,1996,20,34
```

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

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

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Exercise 8: Onroad Retrofit

- Create a text file in c:\nmim\nmim20060310\Runspecs
- Name it ORRetro.csv
- Double click – Excel will open it
- Enter a line using format on slide 33
- Make sure appropriate NMIM vehicle class is specified.

Exercise 8: Onroad 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.

Retrofit - Nonroad RPF (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)

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Retrofit - Nonroad RPF: Sample

```
# Test file for NMIM retrofits,,,,,,,,,,,
RETROFIT Program Index, Pollutant, SCC, HPmin, HPmax,
TechType, Retrofit CY Begin, Retrofit CY End, MYbegin,
MYend, Percent Retrofitted, Percent Effectiveness
1, PM,2270008005,75,300, ALL,2007,2007,1996,2006,10,50
```

- First non-comment line ignored
- 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.

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Exercise 9: Nonroad Retrofit

- Create a text file in c:\nmim\nmim20060310\Runspecs
- Name it RetroGSE.csv
- Double click – Excel will open it
- Enter a line using format on slide 38
- Save as .csv
- Make sure desired Fuel/Segment combination in Vehicles/Equipment, Nonroad is specified.

Exercise 9: Nonroad 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—How It Works

- User specifies the fleet in an external Fleet Information File (FIF)
  - ASCII
  - Comma-delimited
- 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.

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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)

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Fleet - Onroad FIF: Sample

```
vehicle class, model year, number of vehicles,
annual mileage
HDDV8b,1999,700,100000
HDDV8b,2000,500,100000
HDDV8b,2001,300,100000
HDDV8b,2002,100,100000
HDDV8a,1995,000,00000
```

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

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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.
  - Does not need to be the same model year
  - See handout “Potential Problems Running NMIM 2005”
- Lots of warning messages, some meaningless, but they won’t prevent the model running.

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Exercise 10: Onroad Fleet

- Create a text file in c:\nmim\nmim20060310\Runspecs
- Name it ORFleet.csv
- Double click – Excel will open it
- Make entries using format on slide 44
- Make sure appropriate NMIM vehicle classes are specified.

Exercise 10: Onroad 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.

Fleet - Nonroad FIF

- Line 1 – 6 fields
  - SCC – 10 digit only
  - HP Bin expressed as HPmax
  - 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

Fleet - Nonroad FIF: Sample

SCC, HPmax, ModelYear, TechType, Population, Hours/Year
Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
2270008005, 175, 2005, ALL, 1, 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
2265008005, 175, 2005, ALL, 1, DEFAULT
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 non-comment line ignored
- Last line must not be blank
- Comments begin with #

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Nonroad Fleet Bugs

- Must select the fleet equipment in Vehicles/Equipment, Nonroad
  - OK to select all – only fleet will be modeled
- Lots of warning messages, some meaningless, but they won't prevent the model running.

Exercise 11: Nonroad Fleet

- Create a text file in c:\nmim\nmim20060310\Runspecs
- Name it NRFleet.csv
- Double click – Excel will open it
- Enter a couple lines using format on slide 49
- Make sure desired Fuel/Segment combination in Vehicles/Equipment, Nonroad is specified.

Exercise 11: Nonroad Fleet (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.

Modifying the NCD

- MySQL
- Graphic tools for MySQL
  - MySQL Query Browser (QB)
  - MySQL Control Center (CC)
- Structure and organization of the NCD
- Adding VMT
- Changing VMT

MySQL

- The NMIM County Database is in MySQL
- NMIM Output is in MySQL
- Documentation on your hard drive: c:\MySQL\Docs
- Web URL: www.mysql.com
- Worth understanding at least a little about it
- Put C:\mysql\bin in your path

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MySQL Query Browser

- A handy utility for examining MySQL Databases and tables
- Can modify individual entries in tables.
- MySQL scripts superior because
  - Can quickly modify many entries
  - Provide a record of what you did
- See installation ReadMe.doc for installation and startup.
- Supported by MySQL

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MySQL Control Center

- A handy utility for examining MySQL Databases and tables
- I like it because
  - Can quickly see how many records in each table
  - Can see data type of each field in a table
  - Can rename tables
- A poor choice for modifying tables.
- Beware
  - 1000 Line default limit
  - Running real as opposed to exploratory jobs
  - You have been warned!
- See installation ReadMe.doc for installation and startup.
- Not supported by MySQL

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NMIM County Database (NCD)

- Tables are generally named in a way that suggests their primary key.
- Cryptic variables are decoded.
- Let's look.

Exercise 12. Experiment looking at the NCD using Control Center or Query Browser

- Click the database NCD20060201
- Click tables
- Which table has the most records?
- Which table has the fewest records?
- Which table has the most variables?
- Which table has the fewest variables?

Structure of MySQL Databases

- C:\MySQL\data
- Each table consists of three files
  - .MYD - the data
  - .MYI - the index
  - .frm - the format
- So to copy a table you must copy three files.

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Exercise 13: Add 2005 VMT to the BaseYearVMT table

- a. Make a copy of the database.
- b. Find out what years have VMT.
- c. Create a text file with 2005 VMT.
- d. Write a MySQL script to import the text file into the BaseYearVMT table.
- e. Run the MySQL script.

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Ex. 13a: Make a copy of the NCD

- Copy NCD20060201 using Windows Explorer
  - Look in C:\mysql\data
- Rename the copy NCD20060201a
- Optional: Verify the copy exists using MySQLCC
  - Right click on Databases, Refresh
  - Verify that copy matches original
    - Table names, variables, number of records
- Optional: Verify using the command window
  - type **`MySQL`**
  - type **`show databases;`**
  - Type **`use ncd20060201;`**
  - Type **`show tables;`**

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Ex. 13b: What years have VMT?

- Use MySQLCC to look at variables in BaseYearVMT
- Open command window
  - Type **`MySQL`**
  - Type **`use ncd20060201a;`**
  - Optional: Type **`describe baseyearvmt;`**
  - Type **`select distinct baseyear from baseyearvmt;`**

Ex. 13c: Create a BYVMT text file to import

- Create a folder: C:\NMIM\ChangeNCD
- Create an Excel spreadsheet (call it NewBYV.xls) in this folder
- Put in the correct headings
- Fill in the values for vtype=1
- To get values for RoadType, mysql> select roadtype from hpmsroadtype;
- Enter \N (for null) for DataSourceId
- Save as tab-delimited text
- You could have created this text file with FoxPro, Access, Oracle, SAS, etc., etc.

Ex. 13d: Write a MySQL script to import the text file into the BaseYearVMT table

- In the ChangeNCD directory, create a new text file, and name it LoadBYV.sql
- This script will
  - add records if the primary key does not exist.
  - change records if the primary key does exist.
- It will work for every single table in the NCD.

Ex. 13d: Write the script (cont.)

- In the script below, notice that
  - We use a complete path for the infile
  - Forward slashes separate directories
  - The order of variables must exactly match the order in the text file. The heading line in the text file is ignored.
  - "#" indicates a comment

```
# MySQL Script to alter BaseYearVMT table
use ncd20060201a;
load data
infile 'c:/NMIM/NMIM20050311/changencd/NewBYV.txt'
replace
into table BaseYearVMT
ignore 1 lines
(BaseYear,VClass,RoadType,FIPSCountyId,FIPSStateId,
DataSourceId,VMT)
;
```

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Ex. 13e: Run the script to import the text file into the BaseYearVMT table

- Open a command window
- cd c:\nmim\nmim20050311\changencd
- Type

MySQL –vvv < loadbyvmt.sql

  - The –vvv means verbose
  - Note that you can now run any MySQL script!

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Ex. 14: Query the database

- We already did this in exercise 11b
- Verify that our data got added:
  - MySQL>select * from baseyearvmt where baseyear=2005;

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Ex. 15: Export SCC table to a text file we can read into Excel, SAS, Oracle, etc.

- Write a script,
  c:\nmim\nmim20050311\changeNCE\ExportSCC.sql

```
use NCD20050318;
select sccid, scc, segment, sccdesc
into outfile
'c:/nmim/nmim20050311/changeNCD/scc.txt'
from scc;
```


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Ex 15 (cont.): Run the script

- From command prompt

C:\nmim\nmim20050311\changeNCD>

- Type

MySQL < exportscc.sql

- Open scc.txt using Excel

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Running NMIM from the Command line

- Nmimbatch.log
- Save M6 and NR input files

Running the Master from the Command Line

- Worker must still be started as a GUI
- Documentation in NMIM User Guide

```
c:\NMIM\NMIM20050311>
java gov.epa.otaq.nmim.core.NMIMCommandLine
```

- Try it - no arguments gives usage
- Put it in a batch file “runnmim.bat” and try it again

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Argument	Parameters	Purpose or function
-m6in	None	Indicates whether to save mobilex.in files.
-m6svmt	None	Indicates whether to save SVMT files.
-m6tb1	None	Indicates whether to save aggregated mobilex.tb1 file from the worker.
-m6err	None	Indicates whether to save mobilex.err files.
-m6errtxt	None	Indicates whether to save M6error.txt files.
-m6process	None	Indicates whether to save ProcessOutput.txt files produced by MOBILE.
-nropt	None	Indicates whether to save NONROAD .opt files.
-nrmsg	None	Indicates whether to save NONROAD .msg files.
-nrout	None	Indicates whether to save NONROAD .out files.
-nrprocess	None	Indicates whether to save ProcessOutput.txt files produced by NONROAD.
-r	RunSpec file name and path	Specifies the location and name of a RunSpec file. If not using the "-rl" argument, then there should be at least one occurrence of "-r".
-o	Output folder name and path.	Specifies the location of the output files saved during batch mode. If not specified, then the current directory will be used. **NOTE: This is a name of a directory, not the name of a file.** **Also, if using double quotes to specify the directory path, you cannot use a trailing backslash.**
-e	1 - 5	Specifies the level of errors that should be logged into the log file. 1 = only RUN_ERROR types should be logged. 2 = ERROR and RUN_ERROR types should be logged. 3 = WARNING, ERROR, RUN_ERROR types should be logged. 4 = INFO, WARNING, ERROR, RUN_ERROR types should be logged. 5 = all error types should be logged.
-rl	RunSpec list file name and path	Specifies the location and name of a file that contains a list of RunSpec files to run. See "RunSpec List File Format" below.
-ol	Options list file name and path	Specifies the location and name of a file that contains a list of options. See "Options List File Format" below.

Exercise 16: Run test1.nrs from Command Line

```
c:\NMIM\nmim20050311>java gov.epa.otaq.nmim.core.NMIMCommandLine
 -r RunSpecs/test1.nrs -m6in -m6svmt -nropt -o OptIn -e 5
```

- Only -r RunSpec required
- Put the rest of this into your batch file
- Run it
- NMIMBatch.log always created--look
- Look at the M6 in and SVMT files and NR opt files

RunSpecs

- XML code that can be text-edited
- Example
- Most codes obvious or easy to figure out
  - “pollutant index” codes an exception!

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"pollutant index" in XML RunSpec file (NOT the same as RunSpecPollutantIndex in PollutantCode Table)

- 1 - Brake PM 10
- 2 - Exhaust PM 10
- 3 - Tire PM 10
- 5 - Brake PM 2.5
- 6 - Exhaust PM 2.5
- 7 - Tire PM 2.5
- 9 - SOA
- 10 - CO
- 11 - CO2
- 12 - HC
- 13 - NH3
- 14 - NOX
- 15 - SO2
- 16 - Acetaldehyde
- 17 - Acrolein
- 18 - Benzene
- 19 - Butadiene
- 20 - Formaldehyde
- 21 - MTBE
- 22 - Additional HAPS
- 23 - Dioxin/Furan

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Exercise: XML RunSpec

- Look at test1.rs using a text editor
- Look at it using the NMIM GUI
- Extra
  - Change it using the text editor.
  - Look at the change in the NMIM GUI.
  - Change it using the GUI.
  - Look at the change using the text editor.

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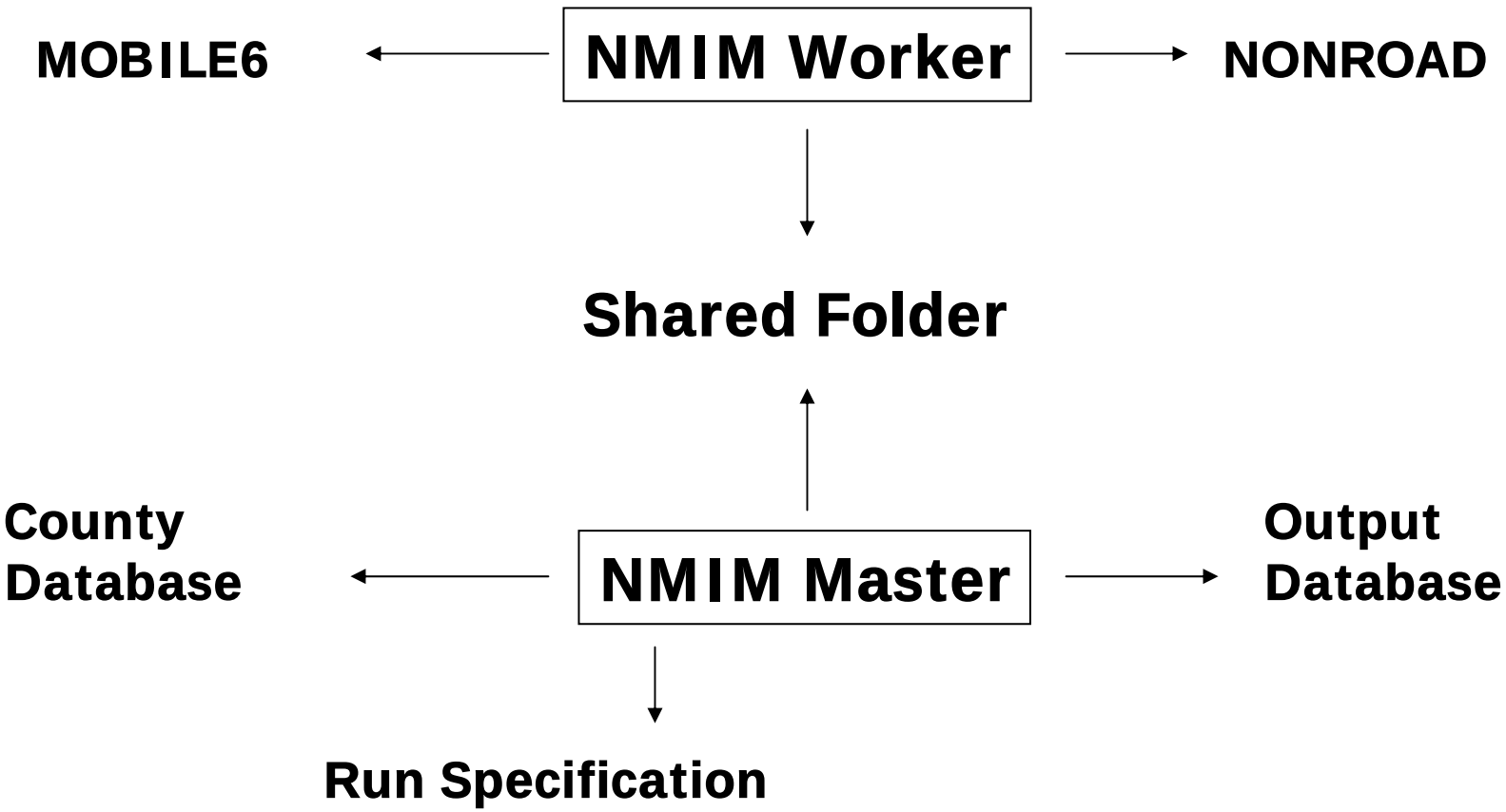
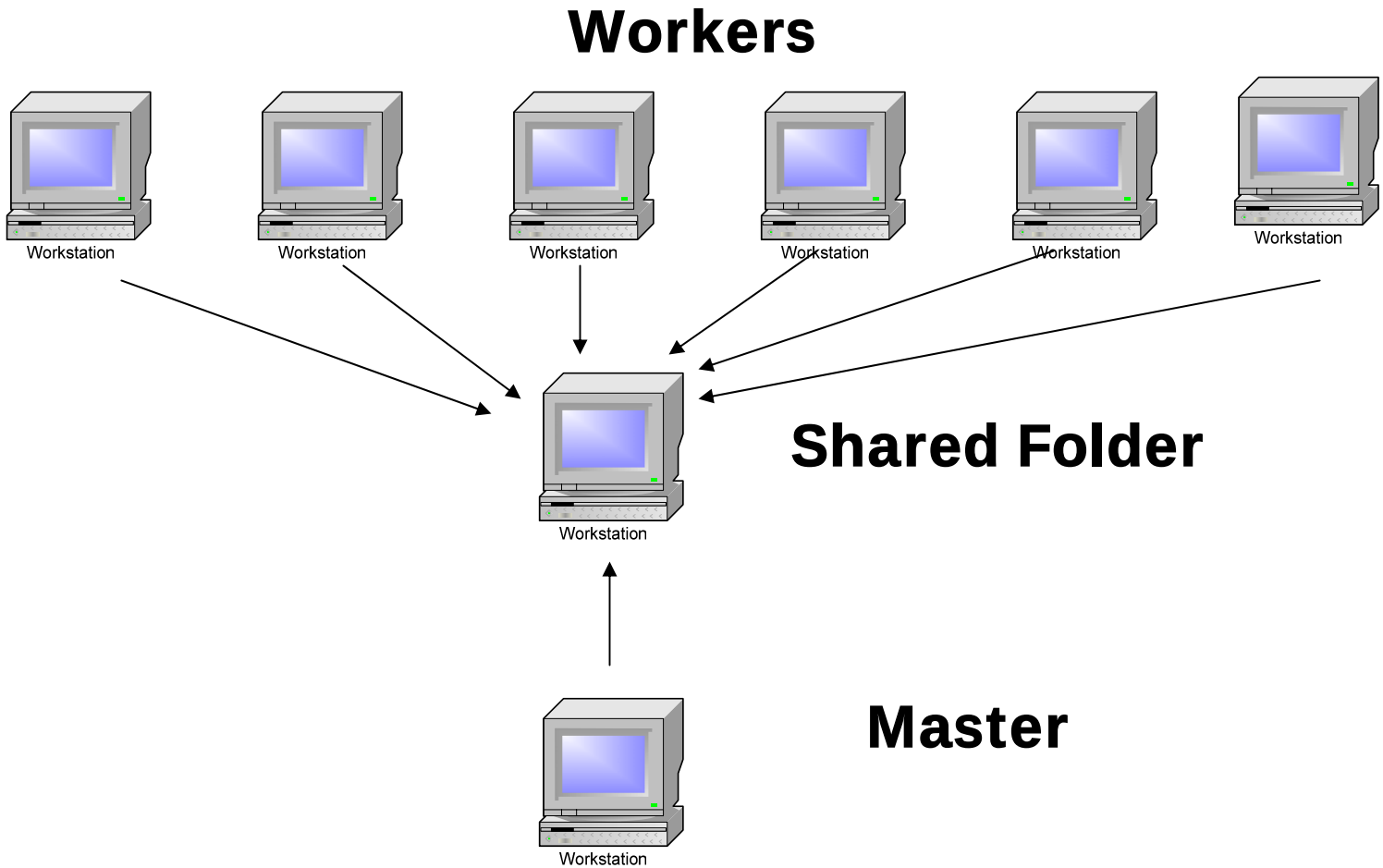
Standalone Processing



Distributed Processing



Distributed Processing

- Workers and Master must point to the same shared folder
- Run only one worker per machine (their temporary database tables will interfere with each other)
- If you have distributed workers, no point in running a worker on the Master machine.

EPA

There are Three NMIM Configuration Files

- NMIMConfiguration.txt
  - Default NCD
  - Path to SharedWork folder
- WorkerConfiguration.txt
  - Paths to MOBILE and NONROAD
  - Path to SharedWork folder
- Setenv.bat
  - Paths to Java & its libraries

Post-run checks

- Search NMIMBatch.log for “error” and “exception.”
- Completeness tests
  - Match count of distinct county-months

Gotchas

- Using County Database for output
- Failing to start worker or having it point to a different shared folder
- Running on-road without VMT in BaseYearVMT

Microsoft Access Database Program Can Be Used as As a Front End for MySQL

- Get ODBC Driver - free download from MySQL.com
  - MyODBC-standard-3.51.07-win.exe
  - Install by clicking on it
- Set up ODBC connection for your MySQL DB
  - Start, settings, control panel, administrative tools,
  - data sources, System DSN tab
  - Add
  - Choose Driver (MySQL ODBC 3.51 Driver), Finish
  - Data Source Name and Database Name: County20040508
  - OK

EPA

Microsoft Access (cont.)

- Open Access
- File, new, blank database
- Create where you want it
- File, get external data, link tables
- Files of type: “ODBC databases”
- Machine databases tab
- Select County20040508, OK
- Link Tables, Select all, OK

Exercise: Start Master and Worker from Command Line

- Why start from command line?
  - One layer simpler than icon
  - Better diagnostics: The window and its messages remain after the GUI closes.
- Master
  - Open command prompt window
  - Go to NMIM root directory (C:\NMIM\NMIM20050311)
  - C:\NMIM\NMIM20050311>setenv
  - C:\NMIM\NMIM20050311>ant rungui
- Worker
  - Open another command prompt window
  - Go to NMIM root directory (C:\NMIM\NMIM20050311)
  - C:\NMIM\NMIM20050311>setenv
  - C:\NMIM\NMIM20050311>ant runworker
- Close Master and Worker. What happened to the console windows?

EPA

Configuring NMIM

- Three files:
  - NMIMConfiguration.txt
  - WorkerConfiguration.txt
  - Setenv.bat
    - not needed if starting NMIM from icon.
    - needed for starting GUI from command line
    - needed for running from the command line (batch mode)

NMIMConfiguration.txt

```
countyServerName = localhost
countyDatabaseName = County20040508
outputServerName = localhost
sharedDistributedFolderPath = C:\NMIM\sharedwork
mySQLFolderPath = D:\mysql
```

- Must point to a valid NCD
- Shared folder must exist
- Use “localhost” for the server names

EPA

WorkerConfiguration.txt

```
sharedDistributedFolderPath =
C:\NMIM\sharedwork
mobileWorkingFolderPath = C:\NMIM\mobile6\run
mobileApplicationPath =
     C:\NMIM\mobile6\run\MOBILE6203NMIM.exe
nonroadWorkingFolderPath = C:\NMIM\nr03a
nonroadApplicationPath =
C:\NMIM\nr03a\nonroad.exe
```

- MOBILE and NONROAD paths and executables must exist
- Shared folder must exist

Setenv.bat

```
@echo off
set ANT_HOME=C:\ant
set JAVA_HOME=C:\jdk1.3.1_02
set JAVAHELP_HOME=C:\jh1.1.3
set CLASSPATH=
set CLASSPATH=%CLASSPATH%;C:\junit3.7\junit.jar;C:\jfcunit\jfcunit.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\;C:\NMIM\libs\jlfgr-1_0.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\mysql-connector-java-3.0.8-stable-bin.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\jhall.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\jaxp-api.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\xercesImpl.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\sax.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\dom.jar
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\IAClasses.zip
set CLASSPATH=%CLASSPATH%;C:\NMIM\libs\InstallerCustom.jar
set CLASSPATH=%CLASSPATH%;.\
set PATH=%PATH%;%JAVA_HOME%\bin;%ANT_HOME%\bin;%JAVAHELP_HOME%\javahelp\bin
```

Exercise

- Verify that mobile and nonroad paths in WorkerConfiguration.txt exist
- Change the WorkerConfiguration.txt so that one of the paths is wrong
- Restart the worker from icon
- Restart the worker from command line
- Kill a command line job with ctrl-c
- Fix the problem and restart worker

EPA

Example batch file that copies MySQL tables

```
c:\mysql\bin\mysql -e "flush tables"

:: Get the right NR sulfur
copy C:\mysql\data\County20040412\CountyYearMonthRecm.frm C:\mysql\data\County20040412\CountyYearMonth.frm
copy C:\mysql\data\County20040412\CountyYearMonthRecm.myd C:\mysql\data\County20040412\CountyYearMonth.myd
copy C:\mysql\data\County20040412\CountyYearMonthRecm.myi C:\mysql\data\County20040412\CountyYearMonth.myi

:: Use the right representing counties
copy C:\mysql\data\County20040412\CountyMap0730.frm C:\mysql\data\County20040412\CountyMap.frm
copy C:\mysql\data\County20040412\CountyMap0730.myd C:\mysql\data\County20040412\CountyMap.myd
copy C:\mysql\data\County20040412\CountyMap0730.myi C:\mysql\data\County20040412\CountyMap.myi

:: Substitute 1999 temperatures and humidities for average temperatures for all years.
copy C:\mysql\data\County20040412\CountyMonthHour1999.frm C:\mysql\data\County20040412\CountyMonthHour.frm
copy C:\mysql\data\County20040412\CountyMonthHour1999.myd C:\mysql\data\County20040412\CountyMonthHour.myd
copy C:\mysql\data\County20040412\CountyMonthHour1999.myi C:\mysql\data\County20040412\CountyMonthHour.myi

java gov.epa.otaq.nmim.core.NMIMCommandLine -r RH2030c22d11.nrs -nropt -nrmsg -o NH2030c22d11/diagnostics -e 5
```

EPA

Same batch file using environment variables

```
mysql -e "flush tables"
set rs=RH2030c22d11
set diag=NH2030c22d11
set db=county20040412
set source=recm
set map=0730

:: Get the right NR sulfur
set tbl=countyyearmonth
copy C:\mysql\data\%db%\%tbl%%source%.frm C:\mysql\data\%db%\%tbl%.frm
copy C:\mysql\data\%db%\%tbl%%source%.myd C:\mysql\data\%db%\%tbl%.myd
copy C:\mysql\data\%db%\%tbl%%source%.myi C:\mysql\data\%db%\%tbl%.myi

:: Use the right representing counties
set tbl=countymap
copy C:\mysql\data\%db%\%tbl%%map%.frm C:\mysql\data\%db%\%tbl%.frm
copy C:\mysql\data\%db%\%tbl%%map%.myd C:\mysql\data\%db%\%tbl%.myd
copy C:\mysql\data\%db%\%tbl%%map%.myi C:\mysql\data\%db%\%tbl%.myi

:: Substitute 1999 temperatures and humidities for average temperatures
::   for all years.
set tbl=countymonthhour
copy C:\mysql\data\%db%\%tbl%1999.frm C:\mysql\data\%db%\%tbl%.frm
copy C:\mysql\data\%db%\%tbl%1999.myd C:\mysql\data\%db%\%tbl%.myd
copy C:\mysql\data\%db%\%tbl%1999.myi C:\mysql\data\%db%\%tbl%.myi
```

Reasons for copying MySQL tables

- Using historical met data for all years
- CountyMap
- Multiple VMT estimates

Potential Problems Running NMIM2005

U.S. Environmental Protection Agency
Office of Transportation and Air Quality
Assessment and Standards Division

January 6, 2006

There are several problems that NMIM2005 users may encounter that have been identified that are not addressed in the NMIM instructions. The instructions below describe how to avoid these problems when running NMIM2005. They involve 1) Fleet, 2) Retrofit, and 3) lockup and opening a RunSpec.

FLEET BUG

If one MOBILE6 vehicle class is included in a fleet, all the MOBILE6 vehicle classes in the associated NMIM vehicle class must also be included in the Fleet Information File.

A fleet is described in the Fleet Information File and consists of one or more of the 28 MOBILE6 vehicle classes. NMIM output is grouped into twelve vehicle classes. The relationship between these two sets of vehicle classes is shown Table 1 below.

If one MOBILE6 vehicle class is included in a fleet, all the MOBILE6 vehicle classes in the associated NMIM vehicle class must also be included in the Fleet Information File. NMIM will not execute if this requirement is not fulfilled. The number of vehicles and VMT may be set to zero as appropriate. For example, if your fleet consists only of HDDV8b trucks in model years 1990, 2000, 2001, and 2002, you must also include one line of HDDV8a trucks, setting the number of vehicles and VMT to zero, and choosing any model year earlier than the calendar year of the emissions simulation. It is not necessary to match model years with the HDDV8b trucks. The following Fleet Information File illustrates this example.

Example Fleet Information File:

```
vehicle class, model year, number of vehicles, annual mileage
HDDV8b,1999,700,100000
HDDV8b,2000,500,100000
HDDV8b,2001,300,100000
HDDV8b,2002,100,100000
HDDV8a,1995,000,00000
```

Adding this additional line with the number of vehicles set to zero will not affect the results, but is required in order for NMIM to model this vehicle class.

Table 1. Crosswalk between NMIM and MOBILE6 vehicle classes.

NMIM	M6	NMIM	M6
LDGV	LDGV	LDDV	LDDV
LDGT1	LDGT1	LDDT	LDDT12
LDGT1	LDGT2	LDDT	LDDT34

LDGT2	LDGT3	2BHDDV	HDDV2B
LDGT2	LDGT4		
		LHDDV	HDDV3
HDGV	HDGB	LHDDV	HDDV4
HDGV	HDGV2B	LHDDV	HDDV5
HDGV	HDGV3		
HDGV	HDGV4	MHDDV	HDDV6
HDGV	HDGV5	MHDDV	HDDV7
HDGV	HDGV6		
HDGV	HDGV7	HHDDV	HDDV8A
HDGV	HDGV8A	HHDDV	HDDV8B
HDGV	HDGV8B		
		BUSES	HDDBS
MC	MC	BUSES	HDDBT

RETROFIT BUG

For each MOBILE6 vehicle class specified in the Retrofit Parameter File, the corresponding NMIM vehicle class (see Table 1 above) must also be specified in NMIM's Vehicles/Equipment, Onroad selection screen.

This is true even if a Fleet Information File is being used to define the vehicle classes. In this case, to make the selection, the "Perform Onroad Fleet Modeling" check box must first be unchecked; otherwise NMIM's Vehicles/Equipment, Onroad selection screen is grayed out. After making the appropriate NMIM vehicle selection, re-check the "Perform Onroad Fleet Modeling" check box. NMIM's vehicle selection screen will again be grayed out, but the selections you made will remain.

To avoid this problem, always make the Vehicles/Equipment, Onroad selections for output before you make any selections in the Fleet or Diesel Retrofit screens.

LOCKUP AFTER HITTING EXECUTE FROM THE GUI

If, first thing after starting the Master GUI, you open a RunSpec in which localhost and a County Database are specified using the Advanced Features, the NMIM program will lock up when you try to execute any NMIM runspec. The symptom is that the blue progress bar does not start across the bottom of the GUI. Instead, it remains gray. This is true even if you load another RunSpec or create a new RunSpec without closing NMIM. The effect occurs when the first thing you do (that affects the Advanced Features County Database Server) is to load a RunSpec in which localhost and a County Database are specified. This effect cannot be undone without closing and reopening NMIM.

Since it is very desirable to specify the county database in all your RunSpecs, and since the drop-down menu does not function without specifying localhost, a work-around is desirable. Any one of the following three work-arounds is effective. You need only to do one.

1) After opening the NMIM Master GUI, but before opening the RunSpec you are interested in, go to Advanced Features and type in localhost for County Database Server. Then open the RunSpec. Strangely enough, this solves the

problem. Opening subsequent RunSpecs will not cause this problem to recur. It is associated only with the very first RunSpec opened after starting the GUI.

2) Edit your RunSpec with a text editor and change countydb server="localhost" to countydb server="". Since "localhost" is optional, your RunSpec will work OK without it, you will prevent future problems with this RunSpec. Altering all of your RunSpecs will prevent this problem.

3) Edit your RunSpec using the GUI. To do this, first remove localhost from County Database Server, then go to any other screen (Pollutants, for example), then return to Advanced Features and select your database from the drop down menu. Then save the RunSpec. This procedure will eliminate localhost from the County Database Server.

If you have questions regarding these instructions, you can contact us at:

mobile@epa.gov