NMIM Training
Part 1
Basics

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4 Parts

- 1. Basics
- 2. Fleet and Retrofit
- 3. MySQL and Modifying the NCD
- 4. Advanced Topics

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Thanks to

- Dave Brzezinski—roaming assistance
- Gary Dolce (TRPD)—slides dealing with SIP, Conformity, and Retrofit Guidance.

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Course Objectives

- Install NMIM (Done—Congratulations!)
- Run NMIM from the GUI
- View and post-process output
- Edit, save, and modify Run Specifications
- Simulate a Fleet
- Run a Retrofit program

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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.

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Other topics, if time/demand, e.g.:

- Modify/customize the NMIM County Database
- 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: 8:30 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.

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Logistics (cont.)

- For the hands-on exercises, I'll do it, then we'll walk through it together.
    - Work together – you'll learn more.
    - If you finish an exercise, please help others who are having trouble.
    - Ask questions.
    - Flag down Dave if you get stuck.

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Expected Preparation

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

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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

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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. To subscribe: http://www.epa.gov/otaq/models/mobilelist.htm
- We won't be able to cover everything
- Dave will be around for the rest of the week
- You can ask questions by phone or email. mobile@epa.gov

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Resources

- Handouts—
  - These Slides
  - Listserver notice "Potential Problems Running NMIM 2005"
- The NMIM User Guide is in the Help menu of the NMIM GUI
- NMIMInstall20060328\NMIMDocumentation
  - 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

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Resources (cont.)

- Readme folder in C:\mysql\data\NCD20060201—Database documentation
    - CountyDB.doc - Lists of tables and fields with units
    - 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
- C:\mysql\Docs—excellent documentation; includes a tutorial.
- NMIMInstall20060328\MySQLTools
    - "MySQL from an ACCESS mdb.doc"

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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

- Not idiot-proof—it helps to understand how it works

- See handout "Potential Problems Running NMIM 2005"

- Revision available soon fixing some bugs

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What is NMIM?

- The **N**ational **M**obile **I**nventory **M**odel
  - a consolidated emissions modeling system for MOBILE6.2 and NONROAD2005
- Main use case:
  - national county-level inventories for the National Emission Inventory (NEI) and for rulemaking
- Combines a Java^{TM} framework with MOBILE, NONROAD, and a national county database.
- Capable of stand-alone or distributed processing.

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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.

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What does NMIM do?

- **Simplifies the process of creating national county-level inventories**

    - Creates input files, runs MOBILE6.2 and NONROAD, and processes output to create inventories

- **Includes capability to estimate emissions from user-specified fleets**

- **Includes capability to estimate reductions from diesel retrofit projects based on user inputs**

    - Can be used for general inventory development or just to calculate reductions from retrofit projects

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NMIM in SIPs and conformity analyses

- NMIM incorporates MOBILE6.2 and NONROAD2005, EPA's current approved models for SIP and conformity purposes
  - NMIM can be used to create inventories for SIPs and conformity analyses
- NMIM is <u>not</u> considered a new motor vehicle emissions factor model or nonroad equipment emissions model
  - A new conformity grace period was <u>not</u> started for NMIM
- Use of NMIM for inventory creation is <u>optional</u>
  - States can continue to use MOBILE6.2 and NONROAD2005 without using NMIM to create input files and process results

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Limitations of NMIM for SIPs and conformity analyses

- **Some states may already be using more sophisticated inventory processing methods**
  - Continue to use those methods rather than NMIM
- **Need to verify that the most recent and best available local information is incorporated in NMIM database**
  - Must modify the database to incorporate newer or better local data
- **Most recent VMT in NCD20060201 is 2002**
  - Must include estimates or projections of VMT for any later years that are included in your SIP or conformity analysis
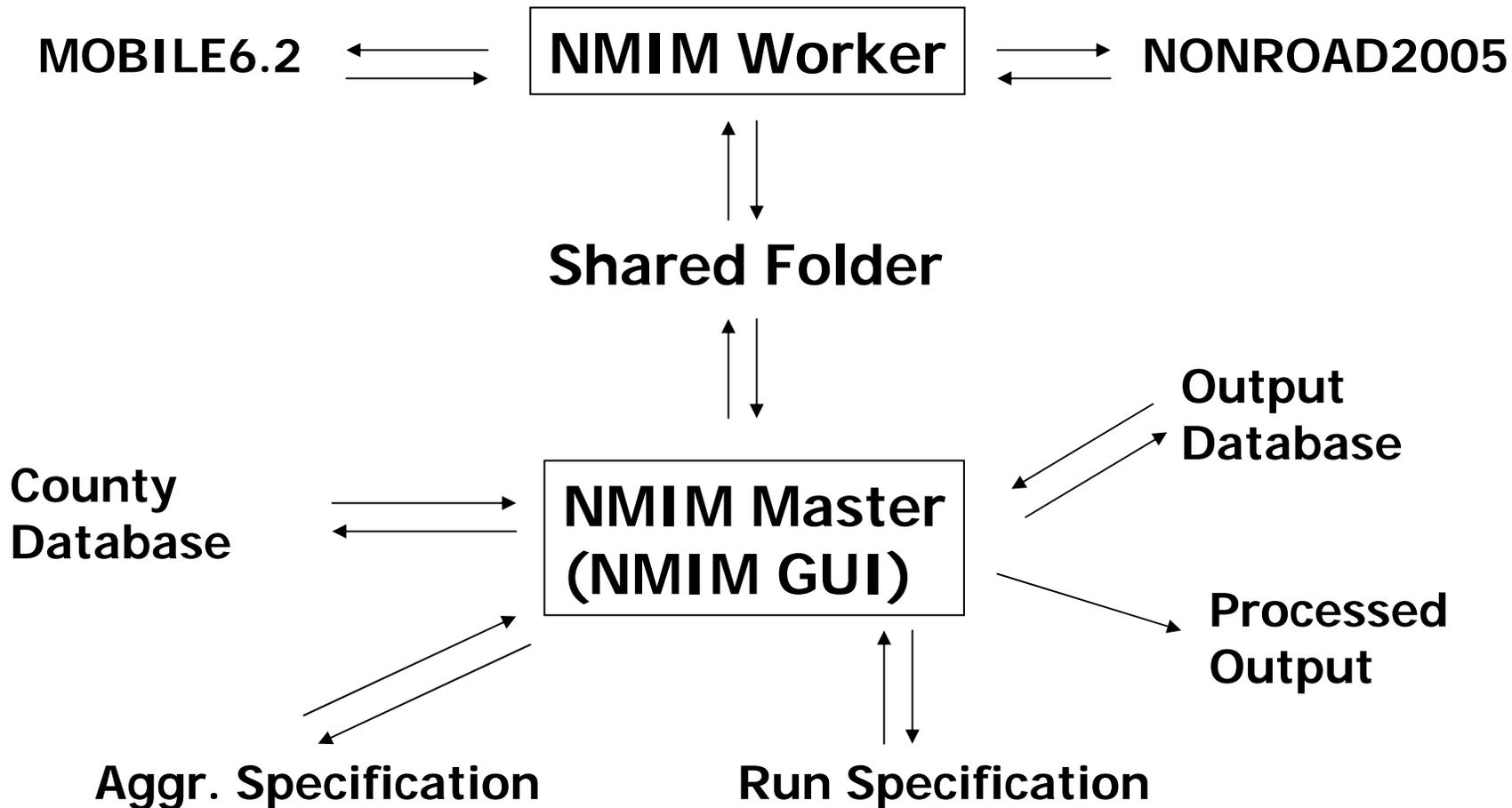
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NMIM County Database (NCD)

- Single consistent data source
- Hourly temperatures, relative humidity (yearly and 20-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

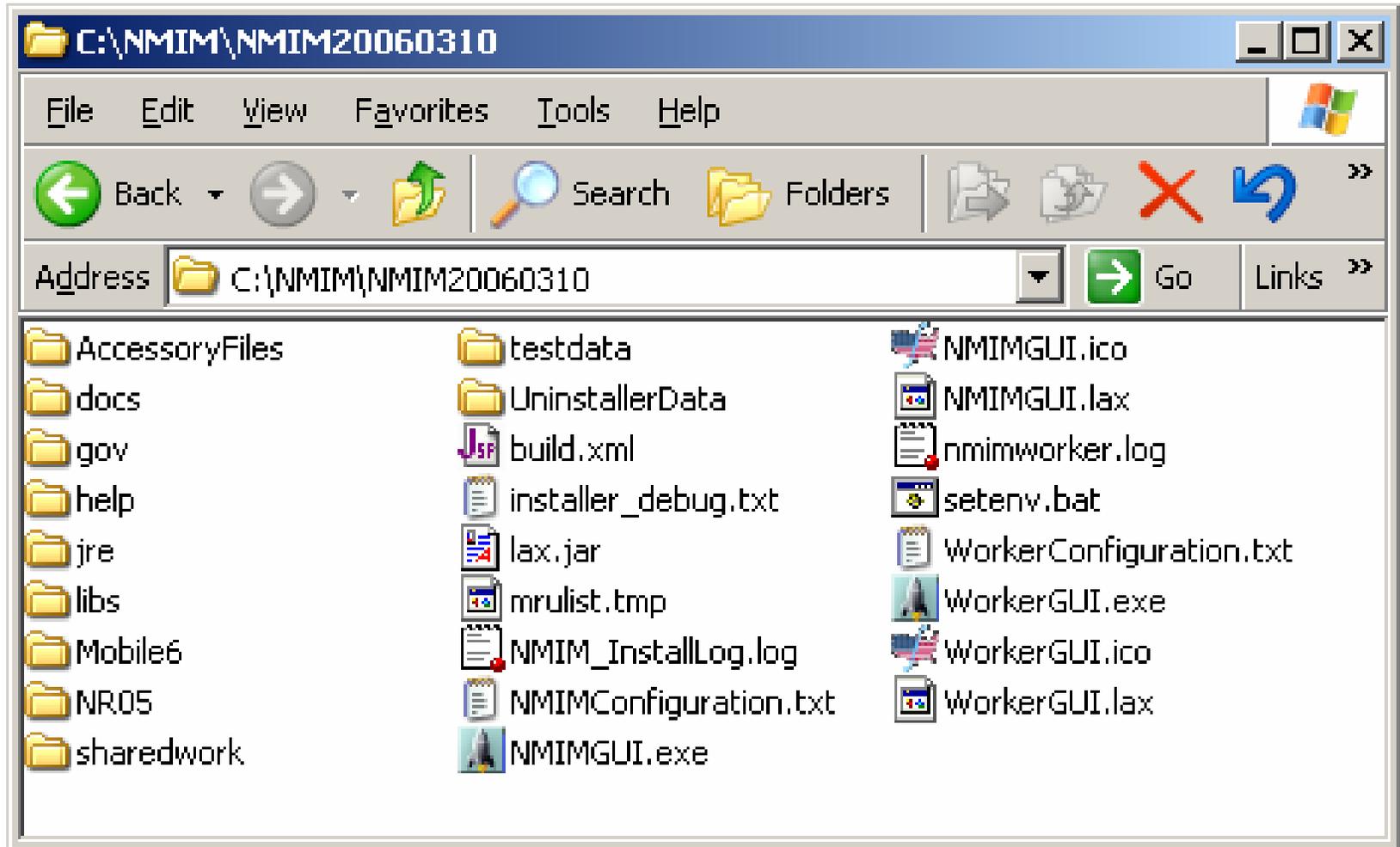- For SIP and Conformity analyses, do not rely on the NCD, but develop your own data.

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How NMIM Works

MOBILE6.2 ← **NMIM Worker** → **NONROAD2005**

Shared Folder

NMIM Master (NMIM GUI)

County Database

Output Database

Processed Output

Aggr. Specification

Run Specification

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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

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NMIM Root Folder

Exercise 1: Start Master and Worker Using Icons

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

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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. Select one county.
- Time – experiment with this screen, then select 2002, click Add, check July
- Vehicles/Equipment
  - Experiment
  - Onroad - select one (suggest LDGV)
  - Offroad - select one (suggest 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: leave blank
  - Database: NCD20060201
- Output
  - Geographic Representation - Select County
  - General Output - name database "test1"
- Save RunSpec -
  - Suggestion: Make a directory: NMIMTraining
  - Suggested RunSpec name: test1.nrs
- Close RunSpec (File,Close)
- Reload RunSpec (File, Open)—are your saved choices still there?

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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
- How to decode SCCID, etc. using NCD20060310

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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.

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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)

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Exercise 7 (cont.):

NIF3 Additional Data

○ **Monthly**   ○ **Annual**   ○ **Typical ozone season day**   **OK**   **Cancel**

Field	Value
Organization Name:	U.S. EPA/OTAQ
Contact Person:	Harvey Michaels
Contact Phone:	734-214-4184
Telephone Type:	Office
Electronic Address:	:haels.harvey@epa.gov
Electronic Address Type:	email
Affiliation Type:	report certifier
Submittal Flag:	
Transaction Type:	00
Incremental Submission #:	1
Reliability Indicator:	0.0
Transaction Comments:	EIOCH2002v2_Oct2004

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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 onroad, 4 NR, 4 refueling files (only OR)
- Overwrites, does not append

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Help Menu

- "About" will tell you your version of the software.

- NMIM User's Guide
  - You can print individual sections.
  - No, we don't have a stand-alone document.

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