HazRAE User Training

Version 3.0

August 2006

PROTECTION THROUGH DETECTION

HazRAE

- A hazardous materials decision support application for assessments of events
  - Chemical
  - Biological
  - Radiological
  - WMD
- Runs on Windows-based PCs and PDAs
- Developed to address the unique needs of first responders determining unknown hazards.

New for Version 3.0

- Blast Tab (IND/IED standoff, detonator ID)
- Reachback capabilities to the web
- 5000+ more agents

Registering HazRAE

- You will need to register your copy of HazRAE, or it will only run 15 times in trial mode
- Go to www.raesystems\hazrae to register
- PDA Version:
  - Fill out the owner information EXACTLY as you have on the PDA
  - PDA serial number is under the battery
  - RAE Systems serial number is on the back of the PDA
- PC Version:
  - User ID is listed under **Options>Register**
  - RAE Systems serial number is listed on your CD
- You will receive your registration key via email within 24 hours

Registering HazRAE

- Enter your registration key into the program by going to **Options>Register** in the black HazRAE tab, entering your code, and selecting **Ok**

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HazRAE Roadmap

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HazRAE Navigation Tabs

- There are 6 navigational tabs at the top of the HazRAE screen

Tab	Description
Search	Search for specific known materials
Discovery	Search for unknown chemicals by color, texture and odor
S&S	Search for unknown chemicals by victim signs and symptoms
Mix	Determine possible reactions when two or more chemicals are mixed
Rad	Comprehensive radioisotope information
Blast	IED/IND Standoff calculator, detonator identification

Search Tab

- The **Search** Tab is used to search for a given hazardous material by:
  - Name (or any part of the name)
  - UNNA (United Nations and North American hazardous chemicals identification number)
  - CAS (Chemical Abstract Services number)
- Simply type any of the above search terms into the Search field at the top of the screen, then tap the **Go** button
- Once a chemical/isotope is found, basic information is displayed
- Use the **Choose View…** menu to see more detailed information on the material

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Search Tab

1. Search field
2. Recall previous searches
3. Results pane
4. Scroll bars
5. Navigation buttons
6. **Choose View…** Menu
7. Navigation Tabs
8. **Go** Button
9. Precursor identifier

Discovery Tab

- The Discovery Tab allows you to search for an unknown material by color, texture and odor
- Multiple selections in each category are allowed– simply tap multiple properties
  - To clear a single selection, tap on the selection again
  - To clear multiple selections, tap “-N/A-” at the top of the selection list
  - To close each pull-down menu, tap the screen outside the menu
  - Tap the **Go** button after you’ve made your selections to search

Discovery Tab

1. Color selection menu
2. Texture selection menu
3. Odor selection menu
4. Results page count
5. **Go** button (search for results)
6. Results pane
7. Navigation buttons
8. Number of hits
9. **Choose View…** Menu

A. Shows/hides IDLH values in the results

Discovery Tab

Color		Texture		Odor			
Amber	Tan/Beige	Chip	Slurry/ Sludge	Alcohol	Fingernail Polish	Mustard	Sassafras
Black	White	Chunky	Solid	Almond	Fishy/ Amine-like	Musty	Sickening
Blue	Yellow	Crystal	Straw	Ammonia	Fragrant/ Floral	New-Mown Hay	Skunk/ Rotten Cabbage
Bronze	Variable	Fiberous	Water insoluble	Anise	Fruity	Offensive	Spices/ Spicy
Brown	Violet	Flake	Water soluble	Aromatic	Garlic	Onions	Suffocating
Copper	Colorless	Fluffy	Waxy	Bananas	Gasoline	Oranges	Turpentine
Cream	Dark	Gas	Oily	Camphor	Germanium	Peanuts	Vanilla
Gold	Light	Granular	Heavier than air	Caramel	Grape	Pears	Vinegar
Gray	Pale	Leafs	Lighter than air	Cedar	Honey	Pepper	Winter-green
Green	Bright	Liquid	Heavier than water	Celery	Kerosene	Peppermint	Bitter
Orange		Metal	Lighter than water	Chlorine/ Bleach	Lavender	Petroleum/ Oil	Sweet
Peach		Needle		Chloroform	Lemon	Pine Pitch	
Pink		Paste		Cinnamon	Smelly Cheese	Plum	
Purple		Pellets		Cloves	Medicinal	Radishes	
Red		Plates		Coal Tar	Menthol	Rancid	
Silver		Powder		Coconut Oil	Moth Balls	Rose	
Straw				Detergent	Mushrooms	Rotten Eggs/ Sulfur	
				Disinfectant			

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S&S Tab

- The **S&S (Signs and Symptoms)** Tab allows you to search for an unknown material by describing signs and symptoms of exposed victims
  - Appearance
  - Behavior
  - Skin
  - Eyes
  - Respiratory
  - Cardiovascular
  - Digestive system
  - Temperature
- Multiple selections in each category are allowed—simply tap multiple symptoms
- The results from the Signs and Symptoms search can be linked to the Discovery results for more accurate and faster searching

S&S Tab

1. Signs/symptoms selection menus
2. **Go** button (search for results)
3. Number of symptoms matched/selected
4. Match ranking of each result
5. **Reset** button (clear results)
6. **Choose View…** Menu
7. Link search with Discovery Tab (narrows search results)

Mix Tab

- The **Mix (Mixtures)** tab allows you to determine possible reactions and precursor uses when two or more chemicals are mixed
  - **Model Reactivity**
    - Two material selections allowed– tap on the two materials to select
    - Displays expected reactivity
  - **Mix Precursors**
    - Unlimited material selections for the mixture
    - Displays probability of the selected mixture to be used as Chemical/WMD, Explosives, Heroin/Cocaine, Methamphetamines, and Unknown
- **Note**: **ONLY** materials that were previously searched for on the **Search** Tab, and then viewed using the **Choose View…** menu, will be available to add to the mixtures. To add a material to the **Mix** Tab, search for it using the **Search** Tab, and tap on **Choose View**….

Mix Tab

- The **Mix Precursors** pane is shown here.

Rad Tab

- The **Rad (Radiation)** Tab allows you to search for an unknown radioactive isotope by its unique spectroscopic “fingerprint”
- This tab should only be used by knowledgeable personnel with the proper spectroscopic equipment

Rad Tab

1. Type of energy emission
2. Emission energy
3. Energy tolerance
4. Minimum probability of occurrence (Alpha & Beta only)
5. Number of results pages
6. Number of hits
7. **Go** (add new search results) and **Reset** (clear cumulative results) buttons
8. Results pane
9. Navigation buttons
10. Number of searches the selected isotope has matched
11. **Choose View…** Menu

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Blast Tab

- The **Blast** Tab displays allows you to calculate IED and IND standoff distances, and identifies detonation devices.

Blast Tab – Detonator ID

1. Type of detonator
2. Detonator manufacturer
3. Detonator category
4. Detonator proportions (length, diameter, case material, crimp style, rings, plug style and color)
5. Number of results pages
6. Number of hits
7. **Go** button
8. **Reset** button
9. Results pane
10. Previous page button
11. Search type button
12. Next page button
13. Details pane
14. Help button
15. Return to main Blast Tab

IED Standoff

- Shows estimated standoff distances for Improvised Explosive Devices (IEDs)
- Use the **Threat** pull-down menu to select the size of the IED (select “Other” to enter your own)
- Select the **Additive** checkbox to “add” multiple devices together
- Deselect the **Additive** checkbox to clear the total

IND Standoff

- Shows estimated standoff distances for Improvised Nuclear Devices (INDs)
- Use the **IED Yield** field to enter the yield of the IND
- Tap **Evac. Distances** to update the figure after making changes
- Tap **Fatalities** to display a pop-up with estimated fatalities for selected international cities

Choose View… Menu

- The **Choose View…** Menu is located at the bottom of the **Search**, **Discovery**, **S&S** and **Rad** Tabs
- It allows additional information on the selected material to be seen (if the information is available from NIOSH Pocket Guide, DOT ERG, etc…, and is compiled into HazRAE)
  - View Guide (2004 DOT ERG)
  - Isolation Distances
  - Hazard Overview
  - Reactive Groups (Chemicals only)
  - Material Profile
  - Protective Clothing (Chemicals only)
  - Respirators (Chemicals only)
  - EMS-Signs/Symptoms
  - EMS-First Aid
- Tap **Return** at the bottom of each screen to go back to the originating tab screen

View Guide

- Shows information regarding
  - Health – toxicity, health effects of exposure
  - Fire/Explosive – Combustibility
  - Safety – Public safety information
  - Clothing – Appropriate protective clothing
  - Evacuation – Evacuation information for various scenarios (spills)
  - Isolate – Isolation distances for various scenarios
  - Response – Emergency response information (type of fire extinguisher, etc…)
  - Spill/Leak – Spill and leak response information
  - First Aid – First aid procedures for exposure
- Select –Entire Guide– to see all sections at once

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Choose View… Menu►View Guide

Isolation Distances-Chemical

- Shows Initial Isolation Zones and Protective Action Zones for applicable chemicals
- Use the pull-down menus at the bottom of the screen to select the size of spill and time of day
  - Small spill = smaller than a barrel
  - Large spill = larger then a barrel

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Choose View… Menu►Isolation Distances

Isolation Distances-Radiation

- Brings up a set of 4 screens
  - Standoff Distance
  - Fallout
  - Dose
  - Radioactive Half-Life
- Use the pull-down menu in the lower right corner to select between the 4 screens
- Tap the **Recalculate** button in the upper right corner to update each screen after making changes to the user inputs

Recalculate

Radiation - Distance

- Shows the dose rate from a point source at increasing distances from the source
- The dose rate reading, in either rem/hr or Sv/hr, from a radiation detector, survey meter, or other device, or the amount of radioactive material in grams should be entered into the field in the upper right corner of the screen
- Displays rem/hr versus distance from source

PROTECTION THROUGH DETECTION

Choose View… Menu►Isolation Distances►Distance

Radiation - Fallout

- Shows dose rate levels from radioactive fallout after given ranges of time after the incident
- The original dose rate reading, in either rems/hr or Sv/hr, from a radiation detector, survey meter, or other device, or the amount of material in grams should be entered into the field in the upper right corner
- Use the pull-down menu in the lower center of the screen to select the time frame

PROTECTION THROUGH DETECTION

Choose View… Menu►Isolation Distances►Fallout

Radiation - Dose

- Shows the accumulated dose over time for a given dose rate at a given distance from a point source
- Enter the dose rate reading from a detection/survey device or amount of material in grams into the field in the upper right corner
- Use the lower center field to enter distance from the source in feet or meters
- Tap **Recalculate** to update the screen after making changes

PROTECTION THROUGH DETECTION

Choose View… Menu►Isolation Distances►Dose

Radiation – Half-Life

- Shows the decrease in activity of a given amount of radioactive material over time
- Enter the amount of radioactive material in the upper right corner
- Enter the number of half-lives into the field in the lower center of the screen to display the actual time

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Choose View… Menu►Isolation Distances►Half-Life

Hazard Overview

- Shows overview information for the selected chemical, or for radioactive materials if a radioisotope is selected
  - IDLH (Immediate Danger to Life and Health)
  - Tlv-TWA (Time-Weighted Average)
  - TEEL1, TEEL2, TEEL3 (Temporary Emergency Exposure Limit, levels 1, 2, and 3)
  - Radiation exposure limits for the Public
  - Special hazards
  - **AEGLs**, **MEGs** and **MEG/CWA** buttons at bottom of screen, where appropriate
    - AEGL: Acute Exposure Guideline Levels
    - MEG: Military Exposure Guidelines
    - CWA: Chemical Warfare Agents

Reachback Button

- Pulls more info on the chosen material from web sources when the PC or PDA is connected to the internet
- Accessible from:
  - **Hazard Overview** – Sources Haz-Map databases
  - **Material Profile** – Sources NIST databases
  - **EMS-First Aid** – Sources Hazard Substances Databank (HSDB) from National Library of Medicine

Hazard Overview - Chemicals

1. Material name, shipping hazard, and water hazard information
2. IDLH value (if applicable)
3. Air/water reactive warning and levels of concern
4. Special hazards (up to 5)
5. **AEGLs**, **MEGs**, and **MEG/CWA** buttons
6. **Return** button

Choose View… Menu►Hazard Overview

Hazard Overview - Radiation

- Shows information regarding exposure limits to radioactive isotopes
- Occupational limits apply to those people working in a radioactive environment
- Public limits apply to all people not covered under the occupational limits

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Choose View… Menu►Hazard Overview

Reactive Groups

- Shows reactivity information and concerns
  - General information
  - Associated reactive groups
  - Flammability
  - Reactivity
  - Toxicity
  - Other characteristics (chemical structures, etc…)
  - Examples

Reactive Groups

1. Material name
2. Reactive groups pop-up menu. Lists the reactive groups the selected chemical belongs to
3. Specific attributes of the selected reactive group
4. Characteristics of the selected attribute
5. **Return** button

Choose View… Menu►Reactive Groups

Material Profile

- Shows chemical and radiation profile data

Choose View… Menu►Material Profile

Material Profile - Radiation

- Shows industrial uses of the radioisotope
- Shows the type of radioactive emissions and energies of those emissions
- Shows the decay chain, which can tell you what else to look for after an incident
- Shows the IAEA (International Atomic Energy Agency) risk level

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Choose View… Menu►Material Profile

Precursors

- Shows possible precursor uses for the given material:
  - Narcotics (heroin, cocaine)
  - Narcotics (methamphetamines)
  - Chemical warfare/ WMD agents
  - Explosives/ improvised explosive devices (IEDs)

Choose View… Menu►Material Profile►Precursors

Protective Clothing

- Shows appropriate chemical protective clothing (CPC) recommendations
- On-hand chemical protective clothing can be selected using the checkbox at the top of the screen (must be set up by user, see CPC on-hand for more details)

Choose View… Menu►Protective Clothing

Respirators

- Shows respirator recommendations for the given material
- Select the appropriate concentration level from the pull-down menu in the middle of the screen

Choose View… Menu►Respirators

EMS-Signs & Symptoms

- Shows signs and symptoms of exposure to the given material

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Choose View… Menu►EMS-Signs/Symptoms

EMS-First Aid

- Shows first aid and emergency life support procedures for exposure to the given material

Choose View… Menu►EMS-First Aid

HazRAE Menus

- Clicking on the black HazRAE tab at the top of the screen displays the HazRAE menu bar
  - Options
  - Edit
  - Preplans

Options Menu

- The **Options** menu contains the following choices
  - Placards
  - Road/Rail ID
  - Container ID
  - NFPA 704 Aid
  - UK/EU Codes
  - Conversions
  - Glossary
  - Register
  - Print Screen
  - About
- Tap **Return** to exit each screen

Placards

- Displays standard hazardous material placards
- Once you find the placard you are looking for, tap **Guide** to display the applicable DOT ERG 2004 guide page

Road/Rail ID

- Displays diagrams and trailer markings and their meanings for truck and rail trailers.
- Once you find the trailer you are looking for, tap **Guide** to display more info

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Container ID

- Enter container ID markings to identify shipper, country of origin, and port codes

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NFPA 704 Aid

- Select the numbers seen in each quadrant of the sign using the pull-down menus
- Fire hazards, health hazards, reactivity and special hazards for the selected numbers are shown in the bottom left corner of the screen

UK/EU Codes

- If UK/EU information is available for the selected material, selecting **UK/EU Codes** from the Options menu will display the **Hazard Overview** screen with UK/EU information
- A **Definitions** pull-down menu is also provided

Conversions

- A conversion calculator for a wide range of units
  - Radiation dose and activity units
  - Distances
  - Temperature

Register

- Used for registering your copy of HazRAE
- PC Version
  - Your **Username** (needed to obtain your registration key) is listed in the **Register** pop-up window
- Displays how many trial runs you have left if you have not registered your copy of HazRAE
- Simply enter your registration key and tap **Ok** to register your HazRAE software

About

- Displays information about HazRAE such as the versions of each software component installed

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Edit Menu

- The Edit menu contains the following choices
  - Copy
  - CPC on-hand
  - Logging setup
- Copy copies any response information that you are looking at onto the system's clipboard. You can then paste it into an email, reporting tools, Microsoft Word, etc…

CPC On-Hand

- To tell HazRAE what chemical protective clothing you have on hand, select **CPC on-hand** from the **Edit** menu
- Select the CPC you have, then tap **Ok**
- To save this list (preplan) for future use, select **Save** from the **Preplan** menu
- Tap **Reset** to clear the list

Logging Setup

- Enabling accountability logging sets HazRAE to log
  - System events
  - User auditing events (to recreate actions taken by a user)
  - Events initiated by the user
- Enter your initials and comments into the field, and then tap **Ok** to begin logging
  - Note: Comments can be entered at any time during the session
- You may turn off logging at any time by deselecting the **Accountability Logging** checkbox

Preplans

- Preplans consist of a pre-selected list of agents and CPC recommendations that you can save for later reference, and share with other HazRAE users
- You can save lists of preplans for future use by using the **Preplans** menu
- Simply research the desired agents, and retrieve any response information for the agents so that they are added to the Recall list, select your CPC using the **CPC on-hand** option from the **Edit** menu, then select **Save** from the **Preplans** menu
- To load a previously saved preplan, select **Load** from the **Preplans** menu, and select the plan you want from the pop-up

Agent and Local Refs

- You can save information on materials to the hard drive of the computer/PDA for later reference, and HazRAE will look them up
- Save to **G3LocalRefs** (Local Refs) folder with first four letters of the file named after the material
- Place Agent Ref documents in the **G3AgentRefs** folder

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HazRAE

The HazRAE database integrates more than 96,000 chemical, biological, radiological agents, explosives and IEDs with critical agent-discovery capabilities into a fast and easy to use decision support system.

Additional Resources

- CAS (Chemical Abstract Services) numbers are used as index numbers to aid researcher in locating information about specific chemicals
- TEEL1, TEEL2, and TEEL3 stand for Temporary Emergency Exposure Limit, levels 1, 2 and 3, respectively. More information can be founds on TEELs at:

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=10641012&dopt=Abstract

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