Developmental Environment, Safety and Occupational Health Evaluation: PESHE Junior
For E2S2 - June 17, 2010

Erik Hangeland
EALSP Program Director
410-436-6986
erik.hangeland@us.army.mil

Noah Lieb
Sharon Chen
Hughes Associates, Inc.
410-737-8677
nlieb@haifire.com
schen@haifire.com
<table>
<thead>
<tr>
<th>1. REPORT DATE</th>
<th>17 JUN 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. REPORT TYPE</td>
<td></td>
</tr>
<tr>
<td>3. DATES COVERED</td>
<td>00-00-2010 to 00-00-2010</td>
</tr>
<tr>
<td>4. TITLE AND SUBTITLE</td>
<td></td>
</tr>
<tr>
<td>Developmental Environment, Safety and Occupational Health Evaluation: PESHE Junior</td>
<td></td>
</tr>
<tr>
<td>5a. CONTRACT NUMBER</td>
<td></td>
</tr>
<tr>
<td>5b. GRANT NUMBER</td>
<td></td>
</tr>
<tr>
<td>5c. PROGRAM ELEMENT NUMBER</td>
<td></td>
</tr>
<tr>
<td>5d. PROJECT NUMBER</td>
<td></td>
</tr>
<tr>
<td>5e. TASK NUMBER</td>
<td></td>
</tr>
<tr>
<td>5f. WORK UNIT NUMBER</td>
<td></td>
</tr>
<tr>
<td>6. AUTHOR(S)</td>
<td></td>
</tr>
<tr>
<td>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</td>
<td></td>
</tr>
<tr>
<td>U.S. Army Research, Development and Engineering Command, Aberdeen Proving Ground, MD, 21005</td>
<td></td>
</tr>
<tr>
<td>8. PERFORMING ORGANIZATION REPORT NUMBER</td>
<td></td>
</tr>
<tr>
<td>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</td>
<td></td>
</tr>
<tr>
<td>10. SPONSOR/MONITOR’S ACRONYM(S)</td>
<td></td>
</tr>
<tr>
<td>11. SPONSOR/MONITOR’S REPORT NUMBER(S)</td>
<td></td>
</tr>
<tr>
<td>12. DISTRIBUTION/AVAILABILITY STATEMENT</td>
<td></td>
</tr>
<tr>
<td>Approved for public release; distribution unlimited</td>
<td></td>
</tr>
<tr>
<td>13. SUPPLEMENTARY NOTES</td>
<td></td>
</tr>
<tr>
<td>Presented at the NDIA Environment, Energy Security &amp; Sustainability (E2S2) Symposium &amp; Exhibition held 14-17 June 2010 in Denver, CO.</td>
<td></td>
</tr>
<tr>
<td>14. ABSTRACT</td>
<td></td>
</tr>
<tr>
<td>15. SUBJECT TERMS</td>
<td></td>
</tr>
<tr>
<td>16. SECURITY CLASSIFICATION OF:</td>
<td></td>
</tr>
<tr>
<td>a. REPORT unclassified</td>
<td></td>
</tr>
<tr>
<td>b. ABSTRACT unclassified</td>
<td></td>
</tr>
<tr>
<td>c. THIS PAGE unclassified</td>
<td></td>
</tr>
<tr>
<td>17. LIMITATION OF ABSTRACT Same as Report (SAR)</td>
<td></td>
</tr>
<tr>
<td>18. NUMBER OF PAGES 17</td>
<td></td>
</tr>
<tr>
<td>19a. NAME OF RESPONSIBLE PERSON</td>
<td></td>
</tr>
</tbody>
</table>
What does RDECOM do?

- Directed Energy
- Command and Control
- Vehicle Technology
- Propulsion & Structures
- Chemical and Biological Protection & Decontamination
- Human Research & Engineering
- Force Protection Technology
- Human Systems
- Clothing & Individual Equipment
- Aerosflightdynamics
- Aviation Applied Technology
- Conventional Ballistics
- Weapons & Materials Research
- Munitions Engineering Technology
- Weapons & Software Engineering
- Vehicle Electronics & Architecture
- Sensors
- Food Service Equipment
- Night Vision and Electronic Sensors
- Tactical Vehicles & RAM
- Combat Vehicles
- Polymer Processing
- Chemical & Biological Protection & Decontamination
- Munitions Engineering Technology
- Weapons & Software Engineering
- Vehicle Electronics & Architecture
- Sensors
Materials/processes/technologies should not be considered innocent until proven guilty in the court of environmental sustainability.
Why do we need ESOH Guidance?

Bottom Line: Need to make Environment, Safety and Occupational Health (ESOH) a performance characteristic.
Examples of Need for ESOH Data Guidance

- Images of military equipment and ammunition are shown, indicating the context of the need for ESOH data guidance.
Goals of ESOH Data Development

- Sustain the Mission
- Reduce Life-cycle Costs
- Reduce Eliminate Impact on Human Health and Environment
What is DESHE?

- Developmental Environment, Safety and Occupational Health Evaluation (DESHE)
  - Process and not a report or document
- Purpose: Develop and document a baseline level of ESOH performance data for each level of research in order to support risk-based decisions
- Phased approach to gather, develop and document ESOH performance data for materials, processes and technologies during all phases of RDT&E
  - Data requirements determined by Budget Activity (BA) level or technology readiness level (TRL)
  - Early stages - qualitative data
  - Higher maturity technologies - More robust, quantitative data
What is DESHE?

**Scope**
All Army RDTE projects (BA1-BA4) not part of acquisition program (i.e. pre-system), with some exceptions (e.g. software development)

**Applicability**
Initially required for select programs (based on level of funding and scope) though all Army RDTE projects can use DESHE process

**Use**
ESOH performance data should be used to support required ESOH acquisition documentation/support informed decisions

Driven by Army RDECOM
Designed with the researcher in mind
Programmatic Environment, Safety and Occupational Health Evaluation (PESHE)

- Scope: All Acquisition programs must maintain a PESHE
- Target Audience: DoD Acquisition community (Program Managers)

ASTM E2552-08 - Standard Guide for Assessing the Environmental and Human Health Impacts of New Energetic Compounds (Army Public Health Command)

- Published May 2008
- Scope: New energetic materials in Research and Development
- Target Audience: Researchers, toxicologists working with new energetic compounds

Environmental and Human Health Hazard Assessment of Chemicals to Support DoD Acquisitions (OSD Chemical and Material Risk Management Directorate)

- Draft
- Scope: New materials throughout acquisition
- Target Audience: DoD Acquisition community (Program Managers)

DESHE (Army RDECOM)

- Early Draft
- Scope: All Army RDTE on materials, processes and technologies
- Target Audience: Army researchers, lab managers, research program directors
Where the DESHE Fits

User Needs

Technology Opportunities & Resources

MATERIEL SOLUTION ANALYSIS
Materiel Development Decision

TECHNOLOGY DEVELOPMENT
Post-PDR A, Post-CDR A

ENGINEERING & MANUFACTURING DEVELOPMENT

PRODUCTION & DEPLOYMENT
FRP Decision Review

OPERATIONS & SUPPORT

DESHE (RDECOM)  PESHE

Environmental and Human Health Hazard Assessment of Chemicals to Support DoD Acquisitions (OSD)

ASTM E2552-08 - Standard Guide for Assessing the Environmental and Human Health Impacts of New Energetic Compounds (Army Public Health Command)
Recipe for DESHE

One DESHE
(Serves the Entire Army)

• 2 c. technology maturity
• 1 c. available funding
• 2 tsp exposure scenarios
• 2 tsp potential for environmental release
• 2 tsp intended use(s)
• Scoop of existing data
• Pinch of regulatory rqts.
• Dash of professional judgment

• Mix well and share
How Does it Work?

**BA1**
- Computational predictions from chemical/physical performance parameters and toxicity
- Acute toxicity data
- Professional judgment

**BA2**
- Experimental values of chemical and physical characteristics
- In-vitro toxicity screening methods
- Acute toxicity data (optional)

**BA3**
- Biodegradation in various media
- In vivo toxicity testing; acute, sub-acute
- Environmental toxicity
- Computational predictions from chemical/physical performance parameters and toxicity
- Experimental values of chemical and physical characteristics
- In-vitro toxicity screening methods
- Acute toxicity data
- Professional judgment

**BA4**
- Chronic toxicity
- Occupational exposure studies, including absorption tests
- Computational predictions from chemical/physical performance parameters and toxicity
- Experimental values of chemical and physical characteristics
- In-vitro toxicity screening methods
- Acute toxicity data
- Biodegradation in various media and environmental toxicity
- In vivo toxicity testing; acute, sub-acute
- Professional judgment

Acquisition Documentation
- PESHE
- NEPA
- HHA
DESHE Timeline for Execution

- Develop DESHE Guidance
- Meet with RDECOM centers and labs
- Distribute guidance for comment
- Publish guidance at end of FY10

FY10

1 to 3 years

- Establish DESHE Program
- Expand to RDECOM-wide

3 to 5 years

5-10 years

- Update ASTM E2552-08
- Implement DESHE in select programs
- Develop and implement RDECOM policy

- Integrate into Army requirements (e.g. AR 70-1)
- Leverage existing guidance and ongoing efforts
- Team based approach
  - Crosstalk with Acquisition, installation and research community
- Establish centralized location for DESHE support
  - Document development, data gathering, publication, data repository
- Make ESOH Performance another performance characteristic
  - DESHE not another box to check
  - Data developed through DESHE process should be incorporated into risk-based decisions and Acquisition environmental documentation
 Acknowledgements

- RDECOM
  - Erik Hangeland
  - Kimberly Watts

- Hughes Associates, Inc.
  - Dan Verdonik
  - Bill Ruppert
  - Sharon Chen

- OSD Chemical and Material Risk Management Directorate
  - Paul Yaroschak
  - Drew Rak (Noblis)

- U.S. Army Public Health Command
  - Dr. Mark Johnson
Environmental Acquisition & Logistics Sustainment Program Elements

- ORDNANCE ENVIRONMENTAL PROGRAM
- TOXIC METAL REDUCTION PROGRAM
- ZERO FOOTPRINT CAMP
- SUSTAINABLE PAINTING OPERATIONS FOR THE TOTAL ARMY
- STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM
- ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM
- ARMY-INDUSTRY SOLVENTS ALTERNATIVES DATABASE
- ARMY-NAVY CHROMATE ALTERNATIVE TESTING

EALSP
Sustain Mission Readiness
Enhance Logistics Support
Integrate Environmental Acquisition
Improve Soldier Survivability

Environmental Quality Technology

Joint / Office of the Secretary of Defense

Corrosion Prevention and Control

Support to PEOs/PMs

Special Programs

- PROTECTIVE COATING DEVELOPMENT
- MATERIAL DURABILITY TESTING
- NON-METAL RESEARCH
- RDT&E MATRIX SUPPORT
- ENVIRONMENTAL RISK MANAGEMENT
- PROGRAMMATIC INFORMATION INTEGRATION
- PERCHLORATE REDUCTION PROGRAM
- OZONE DEPLETING CHEMICALS
- GREENHOUSE GASES

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.