



Indo-US

Workshop on

Vulnerability Assessment for Weaponizable Dual Purpose Chemicals



July 28-29, 2016

CSIR-Indian Institute of Chemical Technology

Hyderabad - 500 007



in association with



Pacific Northwest National Laboratory

Richland, WA, USA

and

U.S. Department of State's Chemical Security Program

Washington, D.C., USA



Indo-US Workshop on

Vulnerability Assessment for Weaponizable Dual Purpose Chemicals



Theme

Chemical facilities are attractive targets for terrorists because of the devastating environmental, economic, health and public safety impacts associated with the uncontrolled, airborne release of large quantities of hazardous chemicals. Hence, the proposed workshop (2 days) on chemical security is developed by the collaboration of a team of emergency management researchers and education specialists from the U.S. Department of Energy's (DOE) Pacific Northwest National Laboratory (PNNL), USA and the CSIR-Indian Institute of Chemical Technology (CSIR-IICT), India, as a joint effort. The focus will be to support the indigenous adoption of tools and techniques to evaluate the security vulnerability of chemical facilities and assess the health and safety consequences of a compromise of security. Our target audience includes emergency management planners and decision makers at facilities that manufacture, use, or store significant quantities of hazardous or weaponizable dual-purpose chemicals.

The workshop will be run as a residential event to encourage intense interactions among the participants

- A Pre-workshop meeting on July 27, 2016 from 19h30-21h00, followed by dinner
- A Pre-dinner Interaction session on July 28, 2016 from 19h00-20h30, followed by dinner

Advisory Committee

Dr. S. Chandrasekhar

Director, CSIR-IICT, Hyderabad

Dr. K. V. Raghavan

INAE Distinguished Professor, Hyderabad

Dr. Clifford S. Glantz

Senior Staff Scientist, PNNL, USA

Dr. Radha Kishan Motkuri

Senior Research Scientist, PNNL, USA

Prof. Ch. Kista Reddy

Dept. of Chemistry, Osmania University, Hyderabad

Organizing Committee

Coordinator: **Dr. G. V. M. Sharma**

Chief Scientist, CSIR-IICT, Hyderabad

Convener: **Dr. R. Srinivas**

Chief Scientist, CSIR-IICT, Hyderabad

Mr. K. Ravindranath

Chief Scientist, CSIR-IICT, Hyderabad

Dr. V. J. Rao

Chief Scientist, CSIR-IICT, Hyderabad

Dr. S. Prabhakar

Principal Scientist, CSIR-IICT, Hyderabad

Dr. T. Prathap Kumar

Principal Scientist, CSIR-IICT, Hyderabad

Workshop Syllabus
Day-1 (July 28, 2016)



09h00 - 09h30: **Registration**

09h30 - 10h30: **Official Opening**

Welcome, Greetings and Introduction of Speakers and Participants

Dr. G. V. M. Sharma
Chief Scientist, CSIR-IICT, India

Purpose, Specific Goals and Course Schedule

Dr. Clifford S. Glantz
PNNL, USA

Dr. K. V. Raghavan
INAE Distinguished Professor, India

Address by the Guest of Honor

Mr. Peter McSharry
Chief, Political Economic Affairs
US Consulate, Hyderabad

Inaugural Address / Release of workshop Documentation by the Chief Guest

Dr. S. Chandrasekhar
Director, CSIR-IICT, India

Vote of Thanks

Dr. R. Srinivas
Chief Scientist, CSIR-IICT, India

0h30 - 11h00: **Tea**

Day-1 (July 28, 2016)

Technical Session I: 11h00 - 13h00

Dual Purpose Chemicals: Human Health Hazards

(Presented by Indian Faculty with a US Lecturer to discuss the US use of Protective Action Criteria)

11h00 - 11h30	L1	Dr. M. Surianarayanan , CSIR-CLRI, India Hazards and Acute Effects of Weaponizable Chemicals
11h30 - 12h00	L2	Dr. Ramakrishnan Narayanan , ICC, India Weaponizable Chemicals: On and Off-site Regulations
12h00 - 12h40	L3	Dr. R. Srinivas , CSIR-IICT, India and Cliff Glantz , PNNL, USA Exposure Limits and Toxicity Effects of Weaponizable Chemicals
12h40 - 13h00		Activity: Workshop Discussion or Illustrative Exercise
13h00 - 14h00		Lunch

Technical Session II: 14h00 - 16h00

Dual Purpose Chemicals: Identification, Accidents and Emergency Preparedness

14h00 - 14h30	L1	Dr. S. Prabhakar , CSIR-IICT, India Identification of Dual purpose chemicals and their degradation products
14h30 - 15h00	L2	Dr. K.V. Raghavan , CSIR-IICT, India Chemical Accidents, their History and Consequences
15h00 - 15h30	L3	Dr. Ramakrishnan Narayanan , ICC, India Emergency Preparedness and Response systems
15h30 - 16h00		Activity: Workshop Discussion or Illustrative Exercise
16h00 - 16h30		Tea

Technical Session III: 16h30 - 18h00

Attackers, their Capabilities and Motivation

16h30 - 16h55	L1	Rob Siefken , PNNL, USA Introduction to Attacks
16h55 - 17h20	L2	Rob Siefken , PNNL, USA Malicious and Non-Malicious Acts
17h20 - 17h50	L3	Rob Siefken , PNNL, USA Information on Adversaries
17h50 - 18h00		Questions and Answers Session

Workshop Syllabus

Day - 2 (July 29, 2016)

09h00 - 09h30: Opening Remarks

- ✦ Welcome
- ✦ Review of Day 1 Highlights
- ✦ Overview of the Day 2 Schedule

Technical Session IV:

Workshop Exercise on the potential threats posed by attackers

Led by US presenters and assisted by all workshop instructors

09h30 - 10h30

- Present Scenario
- Break into groups and address scenario questions
- Present results to the group

10h30 - 11h00 Tea

Technical Session V: 11h00 - 12h00

Chemical Security Assessments

11h00 - 11h10

- L1 **Dr. Radha Kishan Motkuri**, PNNL, USA
Purpose of an emergency preparedness and response program

11h10 - 11h30

- L2 **Rob Siefken**, PNNL, USA
Threat, Vulnerability, Consequence and Risk Assessments

11h30 - 11h50

- L3 **Dr. K. V. Raghavan**, CISR-IICT, India
Techniques for assessing the worst chemical release and the risk of runaway chemical reactions that can lead to an explosive release of hazardous chemicals

11h50 - 12h00

- Workshop Discussion - questions and answers

Technical Session VI: 12h00 - 12h30

Modeling a Chemical Release

12h00 - 12h15

- L1 **Dr. T. Prathap Kumar**, CSIR-IICT, India
PHAST Risk

12h15 - 12h30

- L2 **Cliff Glantz**, PNNL, USA
Using ALOHA

12h30 - 13h30

- Lunch

(Day-2, Continue...)

Day - 2 (July 29, 2016)

Technical Session VII: 13h30 - 14h30

Dealing with Hazardous Chemical Mixtures

13h30 - 13h45	L1	Dr. Radha Kishan Motkuri , PNNL, USA Chemical Mixtures: Assessing the Constituent(s), Emergency Planning and Health Code Numbers
13h45 - 14h00	L2	Dr. Radha Kishan Motkuri , PNNL, USA Introduction to Health Code Numbers
14h00 - 14h10	L3	Cliff Glantz , PNNL, USA The Chemical Mixtures Methodology Workbook
14h10 - 14h20	L4	Cliff Glantz , PNNL, USA The Chemical Mixtures Methodology Wizard
14h20 - 14h30		Workshop Discussion - questions and answers

Technical Session VIII: 14h30 - 15h00

Taking Actions Based on Modeling Results and Risk Assessments

14h30 - 15h00	Cliff Glantz , PNNL, USA
	<ul style="list-style-type: none">• Reducing inventories• Changing Fencelines• Enhancing Security and Safety Measures• Stakeholder Engagement

15h00 - 15h30 Tea

Technical Session IX: 15h30 - 15h45

Who to Turn to for Help

- Industry resources
- Academia resources
- International resources

Technical Session X: 15h45 - 16h15

Workshop Wrap-Up

- How to use workshop materials to share learning with colleagues
- Solicit workshop feedback what worked, what could be improved...
- Thank participants for attending