



Indo-US

Workshops on

Safeguarding Dual-Use Chemicals

The Application of Vulnerability Assessment Tools and
Risk-Based Security Enhancements

2018



July 16-17, 2018

Panjab University, Chandigarh

July 20-21, 2018

GITAM Deemed to be University, Visakhapatnam, Andhra Pradesh



Gujarat University
Ahmedabad



CSIR-IIT
Hyderabad, India



Panjab University
Chandigarh



GITAM Deemed to be University
Visakhapatnam

In association with
Pacific Northwest National Laboratory, Richland, WA, USA
U.S. Department of State's Chemical Security Program, Washington DC, USA
and
Gujarat University, Ahmedabad, Gujarat, India
CSIR-Indian Institute of Chemical Technology, Hyderabad, India



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Safeguarding Dual-Use Chemicals

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Theme

Around the world, specifically in the Indian continent and the United States, there is an immediate need for emergency planning and response personnel to use appropriate tools to deter and mitigate potential threats on industrial facilities that manufacture, use, or store significant quantities of hazardous chemicals. Pacific Northwest National Laboratory (PNNL) under the U.S. Department of State's Chemical Security Program (CSP), in partnership with the CSIR-Indian Institute of Chemical Technology, Gujarat University, Institute of Pesticide Formulation Technology, and other Indian partners, taught "teach-the-teacher vulnerability assessment workshops" emphasizing chemical security in 2016 and agrochemical security in 2017. In 2018, we plan to broaden the geographic impact of our chemical security workshop with an enhanced version that will lead to a self-sustaining, Indian-taught, vulnerability assessment training program available to industries across India.

The main objective of the proposed chemical security training is to enhance security awareness at facilities containing hazardous chemicals (i.e., dual-use chemicals that have productive industrial or research applications, but potentially could be used for malicious purposes). Dual-purpose chemicals are used in the pharmaceutical, biochemical, agrochemical, and other industries. Chemical security training is helpful to a broad set of participants in these industries. In particular, we want to promote awareness and education in technical communities, support the adoption of customer-vetting programs in the chemical sector, and enhance security coordination and communication. *Our target audience includes, but is not limited to, personnel responsible for security at facilities containing dual-purpose chemicals, government security officials and law enforcement authorities, chemical facility managers, facility emergency planners, personnel managing the transportation or distribution of dual-purpose chemicals, and academicians who train people who may work with dual-purpose chemicals.*

Workshop Syllabus

The tentative syllabus for the workshop covers the following topics:

- An introduction to dual-purpose chemicals their positive attributes, history, and potential for malicious use.
- Potential malicious actors/threat agents, security threats, consequence assessment techniques, and emergency preparedness for facilities that have hazardous chemicals.
- Vulnerability assessment techniques and their application within existing regional CSS risk models to enhance security of chemical facilities and dual-purpose materials.
- Guidance on how to develop and implement risk-based and cost-effective chemical security solutions.

The train-the-trainer workshop will include presentations and hands-on exercises using vulnerability assessment tools and other sources of information that are both free and publicly available. Participants will receive training materials to share with their colleagues or to use to conduct their own in-house training courses.

- A pre-workshop meeting on July 15th, 2018 from 19h30-21h00 & a pre-dinner, interaction session on July 16th, 2018 from 19h00-20h30 at Panjab University
- A pre-workshop meeting on July 19th, 2018 from 19h30-21h00 & a pre-dinner, interaction session on July 20th, 2018 from 19h00-20h30 at GITAM Deemed to be University

Workshop Syllabus: Day - 1

09h00 - 09h30: **Registration**

09h30 - 10h30: Inauguration

- Greetings from US and Indian Invitees
- Purpose and Specific Goals of the Workshop
- Introduction of Participants
- Overview of Course Schedule

10h30 - 11h00: **High Tea**

11h00 - 13h00: Technical Session - I

11h00 - 11h30: **L1 Dr. K. Srinivas, CSIR-IICT, India**

Weaponizable Chemicals

- What are They?
- What are Their Uses and Hazards?
- What are the Acute Effects of Exposure?

11h30 - 12h00: **L2 Dr. Clifford Glantz, PNNL, USA**

The Security Concerns of Weaponizable Chemicals

- Theft, Diversion, and Sabotage
- What are the Categories of Potential Adversaries?
- What are the Potential Consequences of a Malicious Release of a Weaponizable Chemical Attack?

11h00 - 13h00: Workshop Syllabus: Day - 1 **Technical Session 1**

12h00 - 12h30: **L3** **Dr. S. Prabhakar**, CSIR-IICT, India
Health Impacts and Exposure Limits for Weaponizable Chemicals

- Key Chemicals and their Degradation Products
- Exposure Limits
- Toxicity

12h30 - 13h00: **L4** **Dr. Radha Kishan Motkuri**, PNNL, USA
Dealing with Hazardous Chemical Mixtures

- Constituents Assessment
- Health Code Numbers
- Emergency Planning

13h00 - 14h00: **Lunch**

14h00 - 16h00: **Technical Session - II**

14h00 - 14h30: **L1** **Dr. Narayanan**, ICC, Mumbai, India
Historical Releases of Weaponizable and Hazardous Chemicals: Accidents and Malicious Events and Their Consequences

14h30 - 15h30: **L2** **Dr. Ken Ferguson**, PNNL, USA
Understanding Threats The First Step in Effective Security

- Know What Assets you want to Protect (e.g., Info, Products, People)
- Know what is of Potential Interest to Adversaries (for Theft or Sabotage)
- Methods of Attack: Physical, Cyber, and Blended
- Developing a Design Basis Threat (DBT) to Identify the Level of Security Capabilities You Want to Have.

15h30 - 16h00: **L3** **Dr. Ken Ferguson & Team**
Workshop Exercise on Threats

16h00 - 16h30: **Tea**

16h30 - 18h00: **Technical Session - III**

16h30 - 17h00: **L1** **Dr. Ken Ferguson & Team**
Report on Exercise Results

17h00 - 17h30: **L2** **Dr. Ken Ferguson & Team**
Chemical Security Assessments

- Introduction to the Vulnerability to Intrusion System
- Analysis (VISA) Process
- Set the stage for tomorrow

17h30 - 18h00: **Questions and Answers Session**

Workshop Syllabus: Day 2

09h00 - 09h15:	Opening Remarks	<ul style="list-style-type: none">• Welcome• Review of Day 1 Highlights• Overview of the Day 2 Schedule
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09h15 - 10h40: Technical Session - IV

09h15 - 10h40:	L1	Dr. Ken Ferguson, PNNL, USA Chemical Security Assessments <ul style="list-style-type: none">• Present Example(s) Involving the VISA Process• Questions, Answers, and Follow-up Discussion
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10h40 - 11h00: **Tea**

11h00 - 13h00: Technical Session - V

11h00 - 12h30:	L1	Dr. Ken Ferguson & Team VISA Process Exercise Report on Exercise Results
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12h30 - 13h00:	L2	Dr. Ken Ferguson & Team Report on Exercise Results
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13h00 - 14h00: **Lunch**

14h00 - 15h30: Technical Session - VI

14h00 - 14h30:	L1	Dr. G.V.M. Sharma, CSIR-IICT, India / Dr. Radha Kishan Motkuri, PNNL, USA Supply Chain Security
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14h30 - 15h00:	L2	Indian Speaker Indian Regulations
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15h00 - 15h30:	L3	Dr. M. R.V.S. Murthy, Ex-OPCW, India The OPCW
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15h30 - 16h00: **Tea**

16h00 - 17h30: Technical Session - VII

16h00 - 16h30:	L1	Dr. Cliff Glantz, PNNL, USA Preparing for a Chemical Release Emergency <ul style="list-style-type: none">• Models• Individual Chemicals and Chemical Mixtures• The Chemical Mixture Methodology
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16h30 - 17h00:	L2	Dr. Ken Ferguson, PNNL, USA Cost-effective Security practices <ul style="list-style-type: none">• Reducing Inventories• Changing Security Boundaries• Enhancing Security and Safety Measures• Stakeholder Engagement• Working with Law Enforcement• Reporting Suspicious Events and Raising Security Awareness
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17h00 - 17h30:	L3	Prof. K. Ravindranath, CSIR-IICT, India Who to Turn to for Help?
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17h30 - 18h00:
Conclusion

- Industry Resources
- Academia Resources
- International Resources

Patrons, Advisory and Organizing Committees

Patrons

- Dr. Girish Sahni**, Director General CSIR & Secretary DSIR, Govt. of India, New Delhi
Dr. S. Chandrasekhar, Director, CSIR-Indian Institute of Chemical Technology, Hyderabad
Prof. Arun K. Grover, Vice Chancellor, Panjab University, Chandigarh
Prof. M. S. Prasada Rao, Vice Chancellor, GITAM Deemed to be University, Visakhapatnam
Prof. H. A. Pandya, Vice Chancellor, Gujarat University, Ahmedabad

International Advisory Committee

- Dr. Clifford S. Glantz**, PNNL, Richland, WA, USA
Dr. Radha Kishan Motkuri, PNNL, Richland, WA, USA
Dr. Laura Schmidt Denlinger, PNNL, Richland, WA, USA
Mr. Jack P. Dishner, U.S. Department of State, Washington DC, USA
Prof. S. K. Mehta, Panjab University, Chandigarh, India
Prof. V. K. Jain, Gujarat University, Ahmedabad, India
Prof. Ch. Ramakrishna, GITAM Deemed to be University, Visakhapatnam, India
Prof. K. Ravindranath, CSIR-IICT, Hyderabad, India
Dr. Jitendra Kumar, IPFT, New Delhi, India
Dr. G. V. M. Sharma, CSIR-IICT, Hyderabad, India

Central Organizing Committee

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Prof. V.K. Jain, Gujarat University, Ahmedabad
Prof. Ch. Ramakrishna (Co-ordinator), GITAM Deemed to be University, Visakhapatnam
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