

AN ADVANCED COURSE

HAZARD ANALYSES FOR LNG FACILITIES

ONSHORE AND OFFSHORE

November 2014

Texas A&M University, College Station, TX

Presented by GexCon & Mary Kay O'Connor Process Safety Center

Gexcon

**MARY KAY O'CONNOR
PROCESS SAFETY CENTER**
TEXAS A&M ENGINEERING EXPERIMENT STATION

LEGISLATION
EXPLOSION MODELING
RELEASE AND DISPERSION
IGNITION
PREVENTIVE MEASURES
MITIGATION
PROBABILISTIC RISK ASSESSMENTS
ACCIDENTS
SELECTED CASES
OUTLOOK



WHO SHOULD ATTEND?

- Safety engineers, managers, supervisors, and other personnel involved in the design, operation or modification of onshore and offshore LNG facilities (import, export, bunkering, transportation, etc.) as well as onshore processing facilities
- Representatives of governmental or public bodies involved in development of safety regulations
- Anyone who would like to develop an understanding of fire and explosion safety for LNG facilities

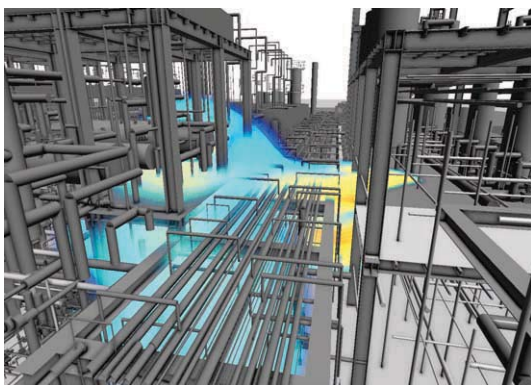
MKOPSC

The Mary Kay O'Connor Process Safety Center's mission is to promote safety as second nature in industry around the world with goals to prevent future accidents. The Center develops safer processes, equipment, procedures, and management strategies to minimize losses within the processing industry.

MKOPSC is located on the TAMU-College Station Campus.
PHONE: 979-845-3489
WEB: <http://psc.tamu.edu/>

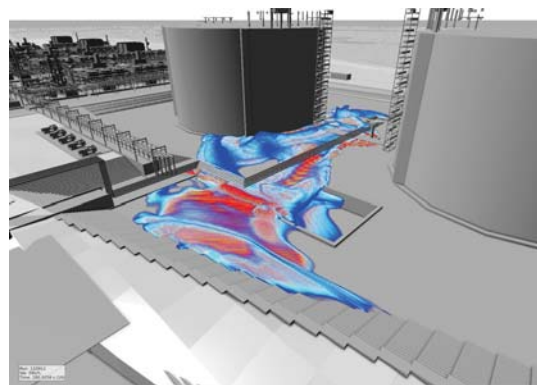
PROGRAM OVERVIEW

GexCon is presenting an advanced course on the analysis of explosion and other hazards for Liquefied Natural Gas (LNG) facilities. The 2-day course will address multiple hazards associated with onshore and offshore LNG facilities including: LNG release and dispersion, explosion modeling, cryogenic spills, prevention and mitigation, probabilistic risk assessments, legislation, accidents, selected case studies. The course will prove helpful to experienced engineers, safety supervisors, and operating managers who are committed to safe workplaces.



CONTENT

- Fundamentals of LNG
- LNG Safety Regulations
- Gas Explosion Basics
- Cryogenic Hazards
- LNG Accidents: History
- LNG Accident Consequence Models
- Prevention and Mitigation
- Quantitative Risk Assessment Methodology
- Analyses – Case Studies



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REGISTRATION

Register before 10th October 2014
Pre-registration is required. Register
for the course online at:

[http://engrevent.tamu.edu/event/
101106](http://engrevent.tamu.edu/event/101106)

Via e-mail to:

val-green@tamu.edu or
gexconus@gexcon.com

Early Registration fee \$1255

Registration after 10th October 2014
\$1395



CONTACT DETAILS

If accommodations are needed
contact College Station Hilton
801 University Drive East,
College Station, 77840,
TEXAS, Phone +1 979-693-7500.

The course will be held on the
Texas A&M University campus,
Emerging Technologies Engineering
Building

ADMINISTRATOR

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GexCon's headquarters are in
Bergen, Norway

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AGENDA

Day 1

- 08:30 Registration and Coffee.
- 09:00 Introduction
- 09:15 **Fundamentals of LNG**
Composition, Cryogenic properties, Hazards
(cryogenic embrittlement, pool fire, flash fire,
explosion)
- 10:00 Coffee Break
- 10:15 **LNG Accidents: History**
Cleveland explosion, Skikda LNG liquefaction facility
explosion, other minor incidents
- 10:45 **Gas Explosion Basics**
Combustion mechanisms, Fuel reactivity, Positive
feedback mechanism, Importance of geometry,
Explosion tests
- 12:00 Lunch
- 13:30 **LNG Accident Consequence Models**
Potential leak sources, dispersion (liquid spills and
flashing jet releases), pool fires, explosions, benefits
of CFD
- 14:30 **Prevention and Mitigation**
Hazardous area classification, Ventilation, Choice of
equipment, Maintenance and procedures, Inventory
control, ESD, Layout modification, etc.
- 15:00 Coffee Break
- 15:15 **Cryogenic Spill Hazards and Cryogenic Spill
Protection**
Hazardous area classification, Ventilation, Choice of
equipment, Maintenance and procedures, Inventory
control, ESD, Layout modification, etc.
- 16:00 End of the First Day

AGENDA

Day 2

- 08:00 Welcome and Coffee
- 08:45 Prepare to Depart for the TEEX/Brayton Fire School
- 09:30 Demonstration of LNG Spill and Pool fire
- 11:00 **LNG Safety Regulations**
49 CFR 193 and current U.S. DOT Guidance;
EN 1473
- 12:00 Lunch
- 12:30 **Hazard Assessment Methodologies**
Deterministic vs. Probabilistic methods
- 13:30 Coffee Break
- 13:15 **Deterministic Analyses - Onshore liquefaction**
Case studies (export and truck-loading facilities)
- 14:00 **Probabilistic Analyses**
QRA examples for onshore facilities and
probabilistic ERA for Floating LNG
- 15:30 Questions and Answers
- 15:45 Closing / Certificates

The lecturers include LNG and gas explosion experts
Dr. Filippo Gavelli and Dr. Scott G. Davis.



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