

# Gexcon

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

AN ADVANCED COURSE

# HAZARD ANALYSES FOR LNG FACILITIES

ONSHORE AND OFFSHORE

November 28-29, 2018

Texas A&M University, College Station, TX

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

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/>

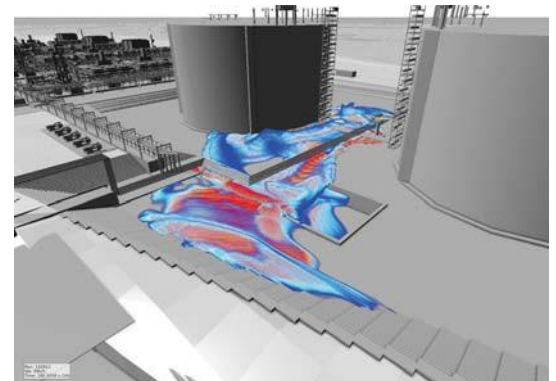
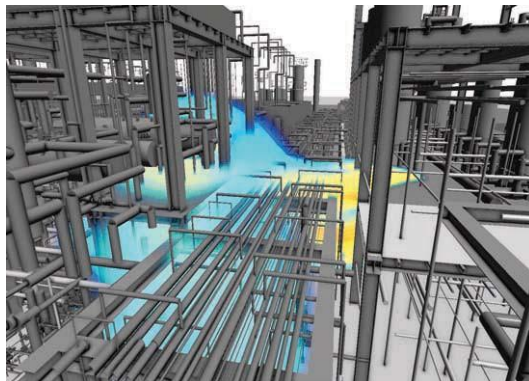
## PROGRAM OVERVIEW

Gexcon is presenting an advanced course on the analysis of explosion and other hazards for the 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 and 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 November 19, 2018  
Pre-registration is required. Register  
for the course online at:

<http://psc.tamu.edu/education/schedule-of-classes-registration>

Via e-mail to:

[sheera@tamu.edu](mailto:sheera@tamu.edu)  
[gexconus@gexcon.com](mailto:gexconus@gexcon.com)

Early Registration fee \$850.00  
Registration after November 09,  
2018:  
\$990.00

## CONTACT DETAILS

If accommodations are needed  
contact TAMU Hotel and  
Conference Center, 177 Joe  
Rouff Blvd  
College Station, 77840,  
TEXAS, Phone +1 888.654.4436.

The course will be held on the  
Texas A&M University campus,  
Jack E. Brown Building

## ADMINISTRATOR

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GEXCON US

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GexCon's headquarters are in  
Bergen, Norway

## 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, Skikds LNG liquefaction  
facility explosion, other minor incidents
- 10:45 Gas Explosion Basics  
Combustion mechanisms, Fuel reactivity, Positive  
feedback mechanism, Importance of geometry,  
Explosion tests
- 11:45 Lunch
- 12:15 Departure to the TEEX / Brayton Fire School
- 13:15 Demonstration of LNG Spill and Pool Fire
- 14:30 LNG Accident Consequence Models  
Potential leak sources, dispersion (liquid spills and  
flashing jet releases), pool fires, explosions,  
benefits of CFD
- 15:45 Cryogenic Spill Hazards and Cryogenic Spill  
Protection  
Hazardous area classification, Ventilation, Choice  
of equipment, Maintenance and procedures,  
Inventory control, ESD, Layout modification, etc.
- 16:45 End of First Day

## AGENDA

### Day 2

- 08:30 Prevention and Mitigation  
Hazardous area classification, Ventilation, Choice of  
equipment, Maintenance and procedures, Inventory  
control, ESD, Layout modification, etc.
- 09:00 LNG Safety Regulations  
49 CFR 193 and current U.S. DOT Guidance;  
EN 1473
- 10:00 Coffee Break
- 10:15 Hazard Assessment Methodologies  
Deterministic vs. Probabilistic methods
- 11:30 Lunch
- 12:30 Deterministic Analyses - Onshore Liquefaction  
Case studies (export and truck-loading facilities)
- 13:15 Coffee Break
- 13:30 Probabilistic Analyses  
QRA examples for onshore facilities and probabilistic  
ERA for Floating LNG
- 15:00 Questions and Answers
- 15:15 Closing / Certificates

The lecturers include LNG and gas explosion experts  
**Dr. Scott G. Davis and Claudio Marsegan**



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