

# LNG Vessel Safety and Security

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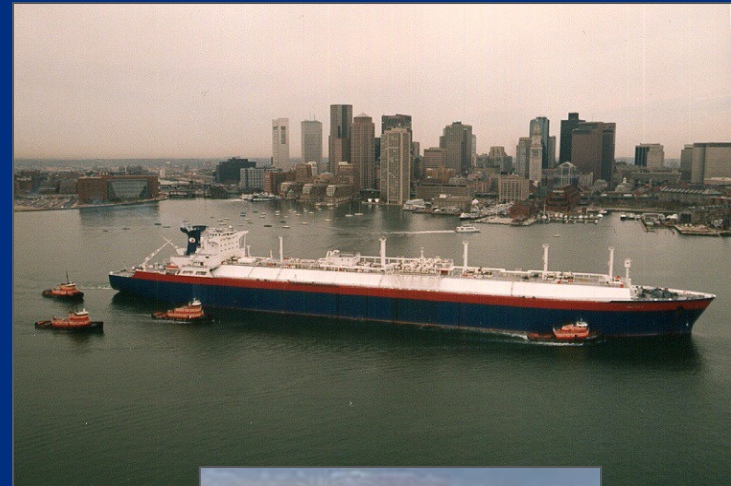


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Houston, TX  
29 November 2006

# LNG Vessels

- Exceptional Safety Record
  - +35,000 safe voyages
- Designed, built, manned & operated to international maritime industry standards
- Robust double-hull design protects cargo tanks
- Compliance enforced through Flag State & Port State Control compliance programs



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# Moss Spherical Tank LNG Carrier



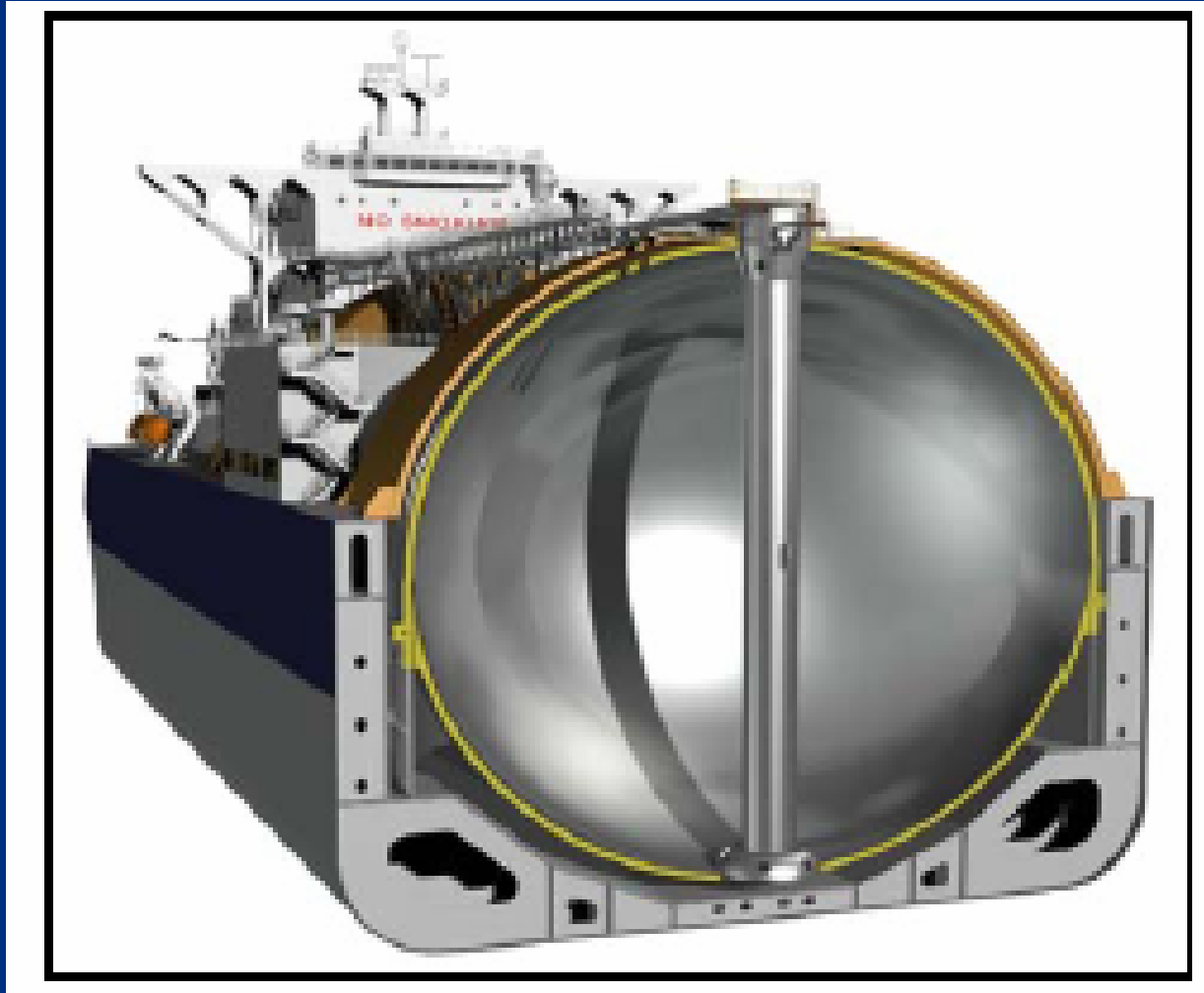
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# Moss Spherical Tank Design



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# Membrane Tank LNG Carrier



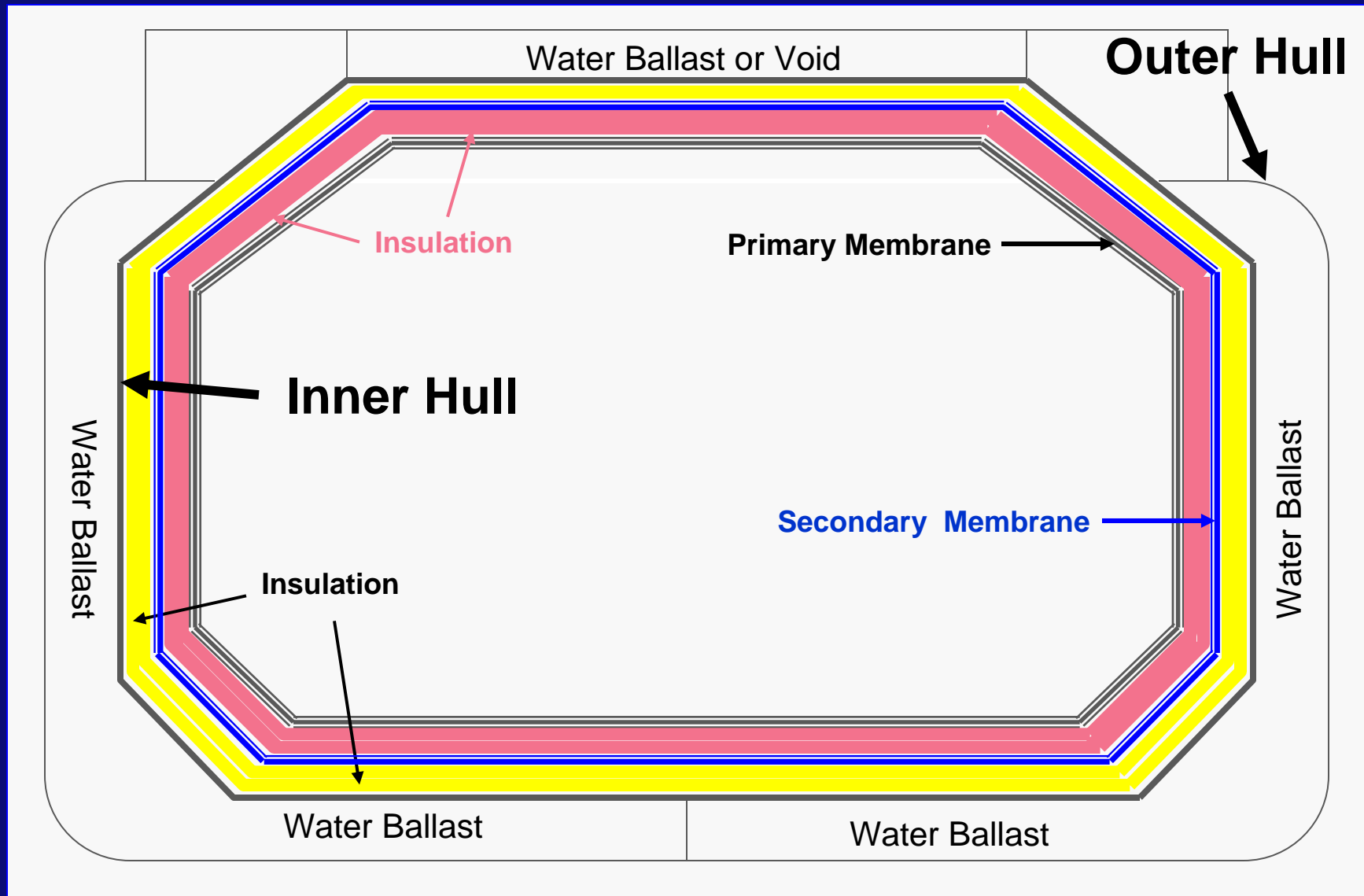
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# Membrane Tank Design





# Membrane Tank Interior



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# LNG Vessel Safety Rules

- International Standards:

- *IMO Code for Construction & Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)*
- *IMO Standards for Training, Certification & Watchkeeping (STCW 95)*

- U.S. Requirements: 46 CFR 154, *Safety Standards for Self Propelled Vessels Carrying Bulk Liquefied Gases*

- U.S. Compliance/Enforcement Program:

- USCG Certificate of Compliance
- Annual Exams





# LNG Vessel Safety Rules

## Examination & Testing Items:

- Vessel Construction
- Firefighting, Life Saving equipment
- Electrical Systems & Intrinsically-safe equip.
- Vapor Recovery & Detection Systems
- Tank Overfill Protection & Relief Valves
- Cargo Transfer & Emergency Procedures
- Emergency Shutdown System for Cargo Transfers



# LNG Vessel Security Rules

- **International Standards:** Int'l Ship & Port Facility Security (ISPS) Code
- **U.S. Requirements:**
  - Maritime Transportation Security Act (MTSA) of 2002
  - Vessel Security Regs, 33 CFR 104
    - Company & Vessel Security Officer
    - Vessel Security Assessment
    - Vessel Security Plan: Access control & identification; monitoring; restricted area designations; cargo handling; procedures for receiving fuel & ship's stores



# Reducing Security Risks for LNG Ships

- Advance Notice of Arrival requirements (96 hrs before arriving in U.S. port)
- Crew list vetted against LE and intelligence databases/watch lists
- Security boardings & positive control measures
- Safety & Security Zones enforced with armed vessel escorts
- Area Maritime Security Plan to address security of port in coordinated & holistic manner





# Homeland Security

