Federal Energy Regulatory Commission

Review of LNG Facilities

Public Informational Meeting on LNG Regulatory Processes

Calais, Maine October 26, 2005

Who is FERC?

- Independent Regulatory Commission
- Five members
  - -Appointed by the President
    - -Confirmed by the Senate

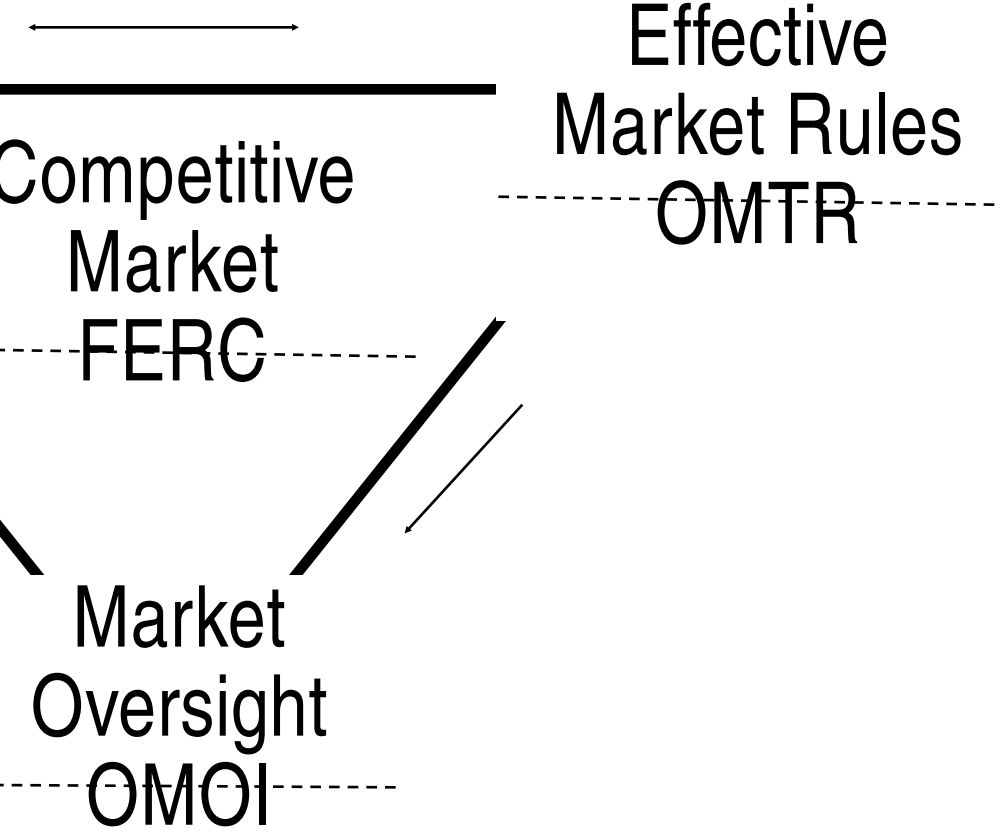
What does FERC regulate?

- Natural Gas
  - Interstate and import/export facility construction and related environmental matters
  - Interstate transportation rates and services
- Electric Power
  - Interstate transmission rates and services
  - Wholesale energy rates and services
  - Corporate transactions and mergers

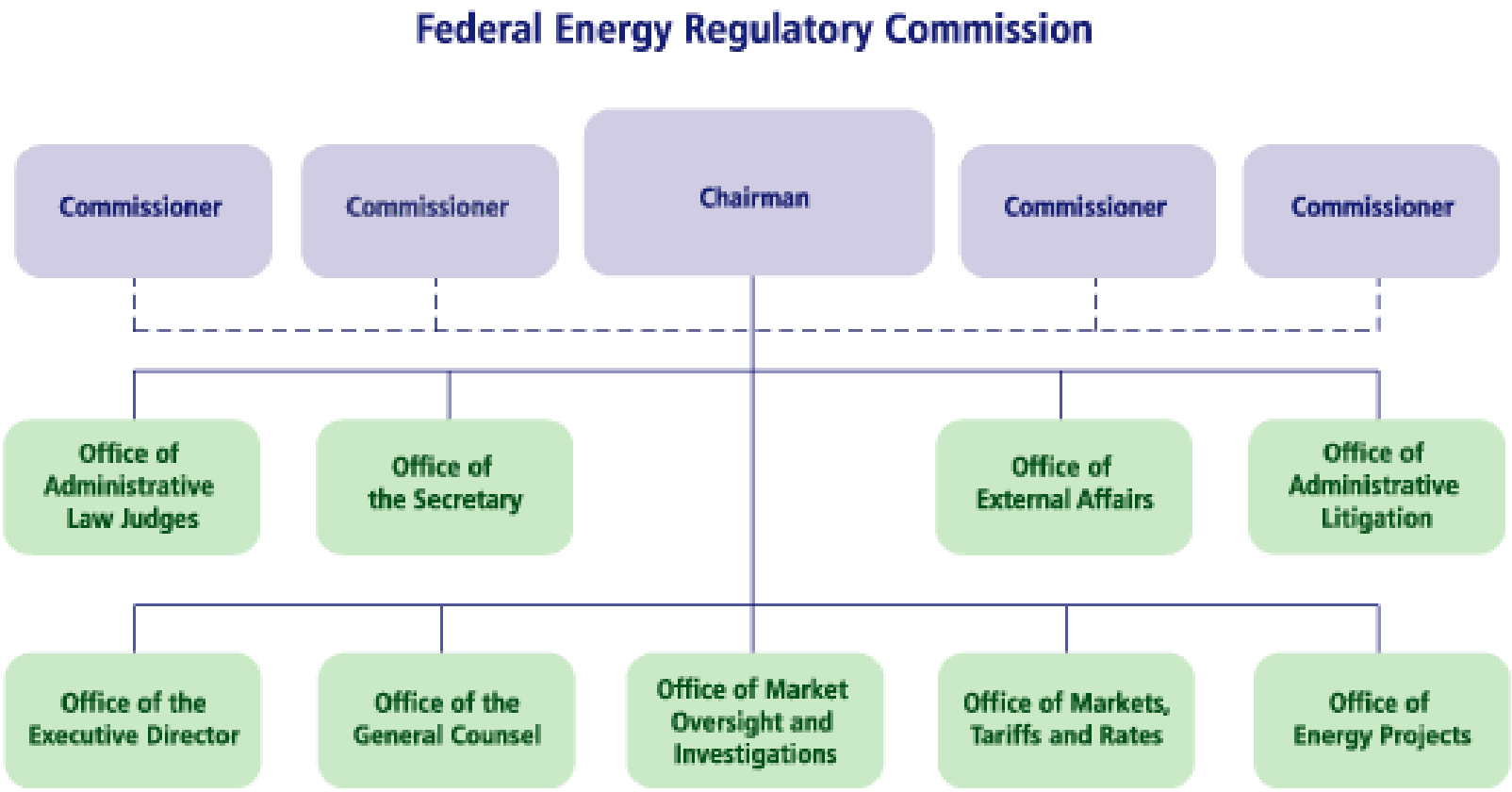
What does FERC regulate?

- Oil Pipeline
  - Interstate transportation rates and services of crude oil and petroleum products
- Hydropower
  - Licensing of nonfederal hydroelectric projects
  - License administration and compliance
  - Inspection, safety, and security at hydropower projects

FERC
Helping Markets Work



FERC Organizational Structure



Gas Program

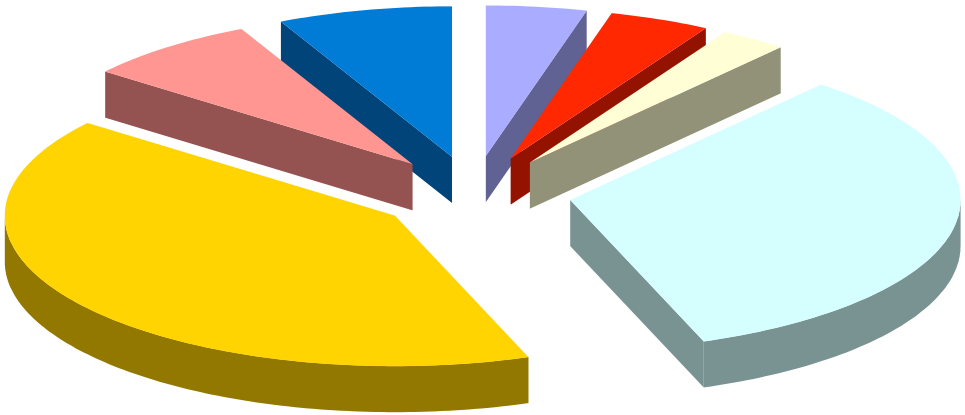
- Evaluate applications for facilities to import, export transport, store or exchange natural gas
- Authorize the construction and operation of facilities for such services
- Approve abandonment of such facilities
- Conduct environmental reviews of proposals involving construction, modification, or abandonment
- Implement Pre-Filing Process
- Conduct inspections of LNG facilities and pipeline construction

LNG – Two Points

- Natural gas is the economic/environmental fuel of choice.

- 96% of natural gas reserves are outside North America.

How Much Natural Gas Is Out There?



Source: EIA, World Oil

How Are LNG Terminals Evaluated?

- Public Involvement
- Technical Analysis
- Safety & Environmental Review
- Public Interest Determination

Who Gets Involved?

- Process is INCLUSIVE!!

  -- Federal, State, Local, Individuals
- Based on Due Process.
- Detailed Review Under NEPA and NGA.
- Mandatory Pre-Filing Process.
- Build Strong Partnerships With All Stakeholders/ Reach Out to Groups.

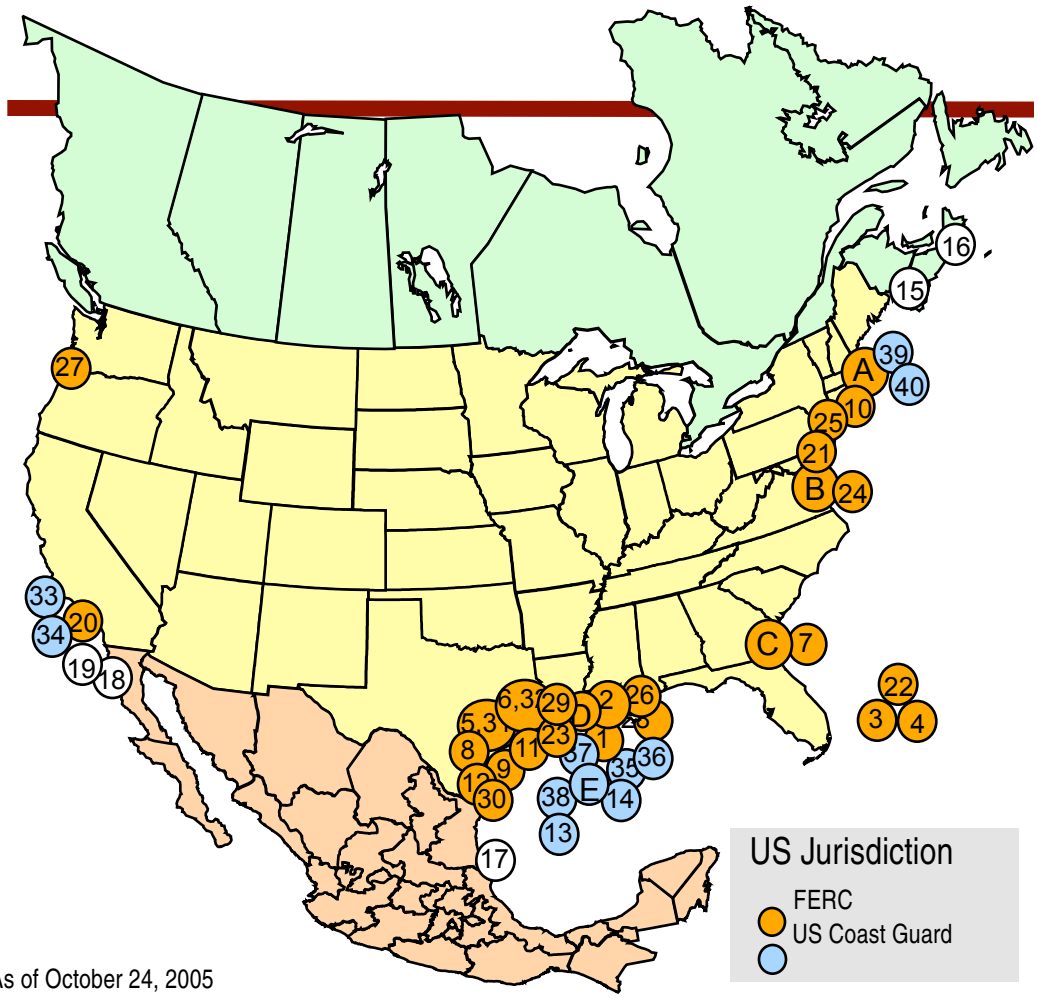
LNG Properties and Safety

- LNG is natural gas that in its liquid state at -259º Fahrenheit - it is commonly stored and shipped at slightly above atmospheric pressure.
- LNG is odorless, colorless, non-toxic - it neither explodes nor burns as a liquid.
- LNG vapors are flammable only in concentrations of 5% to 15% with air and will not explode in an unconfined environment - the ignition temperature is more than 500º Fahrenheit higher than gasoline.
- In the past 40 years there have been more than 33,000 LNG ship voyages without a significant accident or cargo spillage.

Safety?– How Important?

- Essential
- Cryogenic Design Review
- Interagency Cooperation
- Compliance
  - Design Standards & Review
- Inspection
- Monitor Operations

Existing and Proposed North American LNG Terminals

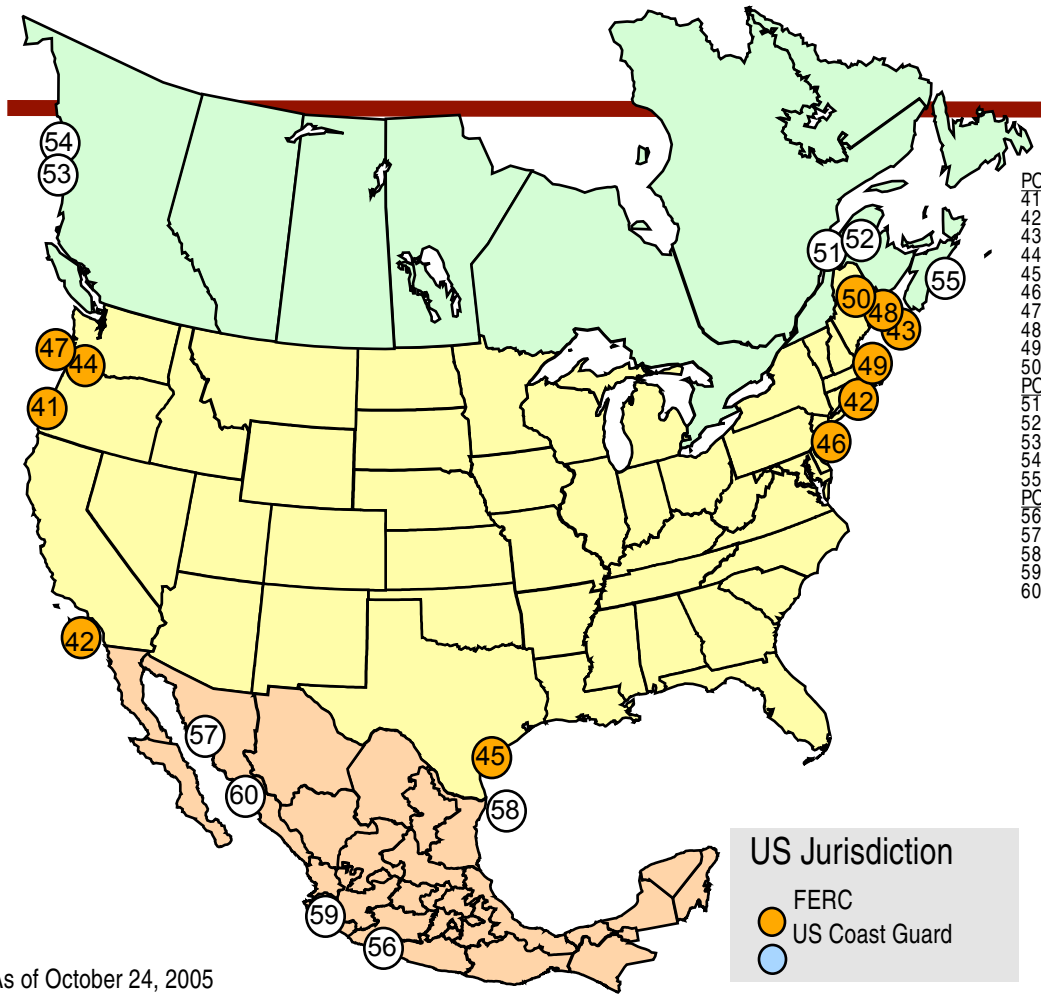


CONSTRUCTED
A. Everett, MA : 1.035 Bcfd (Tractebel - DOMAC)
B. Cove Point, MD : 1.0 Bcfd (Dominion - Cove Point LNG)
C. Elba Island, GA : 0.68 Bcfd (El Paso - Southern LNG)
D. Lake Charles, LA : 1.0 Bcfd (Southern Union - Trunkline LNG)
E. Gulf of Mexico: 0.5 Bcfd, (Gulf Gateway Energy Bridge - Excelerate Energy)
APPROVED BY FERC
1. Lake Charles, LA: 0.8 Bcfd (Southern Union - Trunkline LNG)
2. Hackberry, LA : 1.5 Bcfd, (Sempra Energy)
3. Bahamas : 0.84 Bcfd, (AES Ocean Express)*
4. Bahamas : 0.83 Bcfd, (Calypso Tractebel)*
5. Freeport, TX : 1.5 Bcfd, (Cheniere/Freeport LNG Dev.)
6. Sabine, LA : 2.6 Bcfd (Cheniere LNG)
7. Elba Island, GA: 0.54 Bcfd (El Paso - Southern LNG)
8. Corpus Christi, TX: 2.6 Bcfd, (Cheniere LNG)
9. Corpus Christi, TX : 1.0 Bcfd (Vista Del Sol - ExxonMobil)
10. Fall River, MA : 0.8 Bcfd, (Weaver's Cove Energy/Hess LNG)
11. Sabine, TX : 1.0 Bcfd (Golden Pass - ExxonMobil)
12. Corpus Christi, TX: 1.0 Bcfd (Ingleside Energy - Occidental Energy Ventures)
APPROVED BY MARAD/COAST GUARD
13. Port Pelican: 1.6 Bcfd, (Chevron Texaco)
14. Louisiana Offshore : 1.0 Bcfd (Gulf Landing - Shell)
CANADIAN APPROVED TERMINALS
15. St. John, NB : 1.0 Bcfd, (Canaport - Irving Oil)
16. Point Tupper, NS 1.0 Bcf/d (Bear Head LNG - Anadarko)
MEXICAN APPROVED TERMINALS
17. Altamira, Tamulipas : 0.7 Bcfd, (Shell/Total/Mitsui)
18. Baja California, MX : 1.0 Bcfd, (Sempra)
19. Baja California - Offshore : 1.4 Bcfd, (Chevron Texaco)
PROPOSED TO FERC
20. Long Beach, CA : 0.7 Bcfd, (Mitsubishi/ConocoPhillips - Sound Energy Solutions)
21. Logan Township, NJ : 1.2 Bcfd (Crown Landing LNG - BP)
22. Bahamas : 0.5 Bcfd, (Seafarer - El Paso/FPL)
23. Port Arthur, TX: 1.5 Bcfd (Sempra)
24. Cove Point, MD : 0.8 Bcfd (Dominion)
25. LI Sound, NY: 1.0 Bcfd (Broadwater Energy - TransCanada/Shell)
26. Pascagoula, MS: 1.0 Bcfd (Gulf LNG Energy LLC)
27. Bradwood, OR: 1.0 Bcfd (Northern Star LNG - Northern Star Natural Gas LLC)
28. Pascagoula, MS: 1.3 Bcfd (Casotte Landing - ChevronTexaco)
29. Cameron, LA: 3.3 Bcfd (Creole Trail LNG - Cheniere LNG)
30. Port Lavaca, TX: 1.0 Bcfd (Calhoun LNG - Gulf Coast LNG Partners)
31. Freeport, TX: 2.5 Bcfd (Cheniere/Freeport LNG Dev. - Expansion)
32. Sabine, LA: 1.4 Bcfd (Cheniere LNG - Expansion)
PROPOSED TO MARAD/COAST GUARD
33. California Offshore: 1.5 Bcfd (Cabrillo Port - BHP Billiton)
34. So. California Offshore : 0.5 Bcfd, (Crystal Energy)
35. Louisiana Offshore : 1.0 Bcfd (Main Pass McMoRan Exp.)
36. Gulf of Mexico: 1.0 Bcfd (Compass Port - ConocoPhillips)
37. Gulf of Mexico: 2.8 Bcfd (Pearl Crossing - ExxonMobil)
38. Gulf of Mexico: 1.5 Bcfd (Beacon Port Clean Energy Terminal - ConocoPhillips)
39. Offshore Boston, MA: 0.4 Bcfd (Neptune LNG - Tractebel)
40. Offshore Boston, MA: 0.8 Bcfd (Northeast Gateway - Excelerate Energy)

As of October 24, 2005

* *US pipeline approved; LNG terminal pending in Bahamas*

Potential North American LNG Terminals



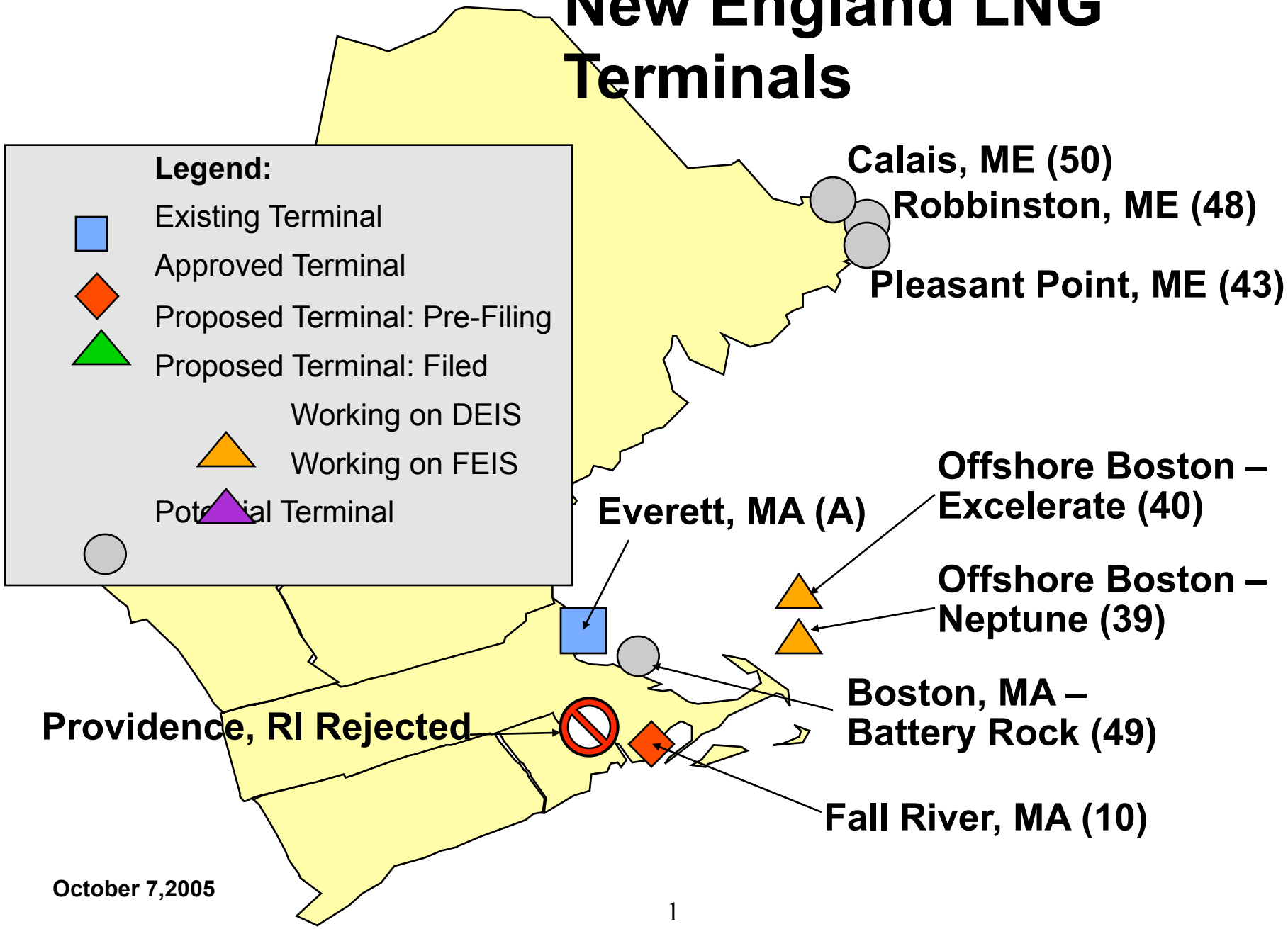
POTENTIAL U.S. SITES IDENTIFIED BY PROJECT SPONSORS
41. Coos Bay, OR: 0.13 Bcfd, (Energy Projects Development)
42. California - Offshore: 0.75 Bcfd, (Chevron Texaco)
43. Pleasant Point, ME : 0.5 Bcfd (Quoddy Bay, LLC)
44. St. Helens, OR: 0.7 Bcfd (Port Westward LNG LLC)
45. Galveston, TX: 1.2 Bcfd (Pelican Island - BP)
46. Philadelphia, PA: 0.6 Bcfd (Freedom Energy Center - PGW)
47. Astoria, OR: 1.0 Bcfd (Skipanon LNG - Calpine)
48. Robbinston, ME: 0.5 Bcfd (Downeast LNG - Kestrel Energy/Dean Girdis)
49. Boston, MA: 0.8 Bcfd (AES Battery Rock LLC - AES Corp.)
50. Calais, ME: ? Bcfd (BP Consulting LLC)

POTENTIAL CANADIAN SITES IDENTIFIED BY PROJECT SPONSORS
51. Quebec City, QC : 0.5 Bcfd (Project Rabaska - Enbridge/Gaz Met/Gaz de France)
52. Rivière-du- Loup, QC: 0.5 Bcfd (Cacouna Energy - TransCanada/PetroCanada)
53. Kitimat, BC: 0.61 Bcfd (Galveston LNG)
54. Prince Rupert, BC: 0.30 Bcfd (WestPac Terminals)
55. Goldboro, NS 1.0 Bcfd (Keltic Petrochemicals)

POTENTIAL MEXICAN SITES IDENTIFIED BY PROJECT SPONSORS
56. Lázaro Cárdenas, MX : 0.5 Bcfd (Tractebel/Repsol)
57. Puerto Libertad, MX: 1.3 Bcfd (Sonora Pacific LNG)
58. Offshore Gulf, MX: 1.0 Bcfd (Dorado - Tidelands)
59. Manzanillo, MX: 0.5 Bcfd
60. Topolobampo, MX: 0.5 Bcfd

As of October 24, 2005

New England LNG Terminals

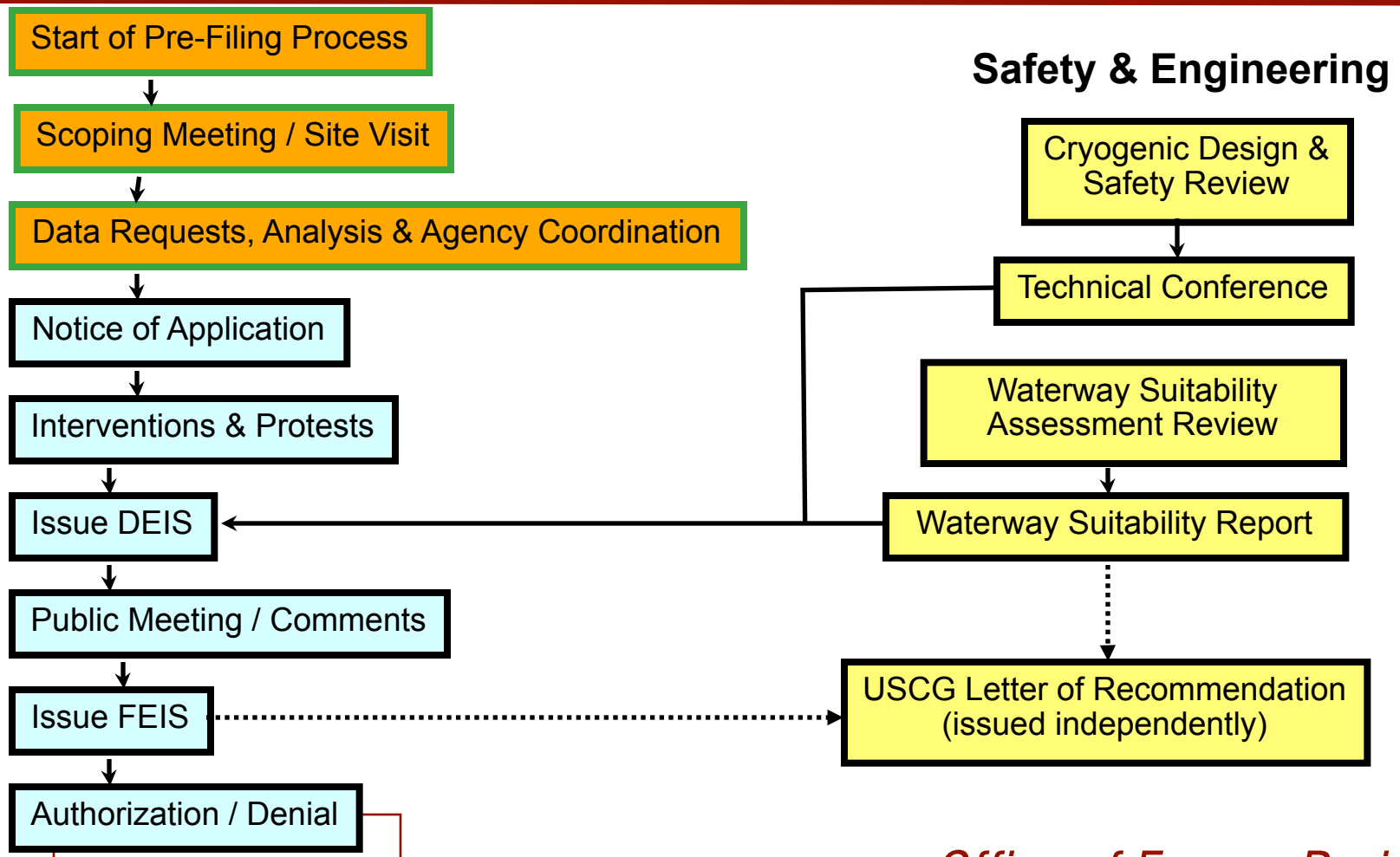


October 7,2005

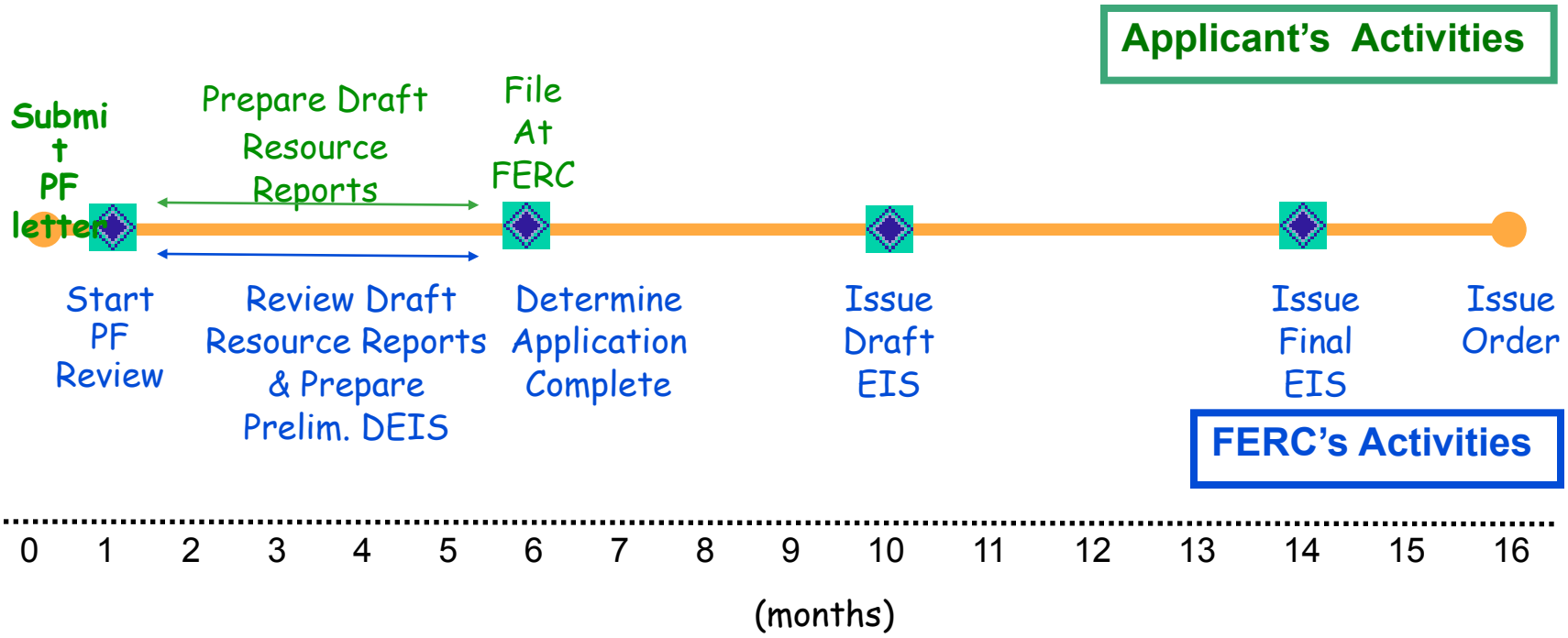
FERC, DOT and the U.S. Coast Guard

- Interagency Agreement on LNG Safety and Security signed 2/04: FERC, DOT, USCG
- Need for guidance recognized as a result of surge in new LNG terminal development
- USCG worked with FERC staff to develop guidance that would meet both agencies' needs-- NVIC issued June 14, 2005
- Needed to address the USCG's NEPA responsibilities

LNG Authorization Process
Mandatory Pre-Filing Review



Timeline for LNG Pre-Filing Process



Pre-Filing Process - Increased Public Involvement

- More interactive NEPA/permitting process, no shortcuts
- Earlier, more direct interaction between FERC, other agencies, landowners
- Time savings realized only if we are working together with stakeholders
- FERC/Agency staff are advocates of the Process, not the Project!
- Goal of “no surprises”

Pre-Filing Activities

--Identify affected parties

Landowners

Agencies

Others

--Issue scoping notice

--Facilitate

- Issue Identification
- Study needs
- Issue resolution

--Examine alternatives

--Attend site visits and meetings

--Initiate preparation of NEPA document

--Review draft application

Post-Filing Opportunities for Public Involvement

The FERC Process:

- Issue Notice of the Application
- Project Sponsor Sends Landowner Notification Package
- Issue Notice of Intent to Prepare the NEPA Document (i.e., scoping)
- Hold Scoping Meetings

Public Input:

- File an Intervention; register for e-subscription
- Contact the project sponsor w/questions, concerns; contact FERC
- Send letters expressing concerns about environmental impact
- Attend scoping meetings

Post-Filing Opportunities for Public Involvement

The FERC Process:

- Issue Notice of Availability of the DEIS
- Hold Public Meetings on DEIS
- Issue a Commission Order

Public Input:

- File comments on the adequacy of DEIS
- Attend public meetings to give comments on DEIS
- Interveners can file a request for Rehearing of a Commission Order

13 Resource Reports

1. General Project Description
2. Water Use and Quality
3. Fish, Wildlife, and Vegetation
4. Cultural Resources
5. Socioeconomics
6. Geological Resources
7. Soils

1. Land Use, Recreation, and Aesthetics
2. Air and Noise Quality
3. Alternatives
4. Reliability and Safety
5. PCB Contamination (for pipelines)
6. LNG Engineering & Design Details

Purpose of USCG NVIC

- Provide guidance to LNG terminal applicants on information it must provide to the USCG to ensure that full consideration is given to safety and security of the port, the facility, and the vessels transporting the LNG.
- Provides guidance to USCG on fulfilling its commitment to FERC to provide input for EIS

Staff's Engineering Review

Onshore Facility Review

- Cryogenic design and technical review
- Safety systems – detection and control
- Exclusion zone calculations
- Security and emergency plans

Marine Safety Review

- Coordination w/ US Coast Guard
- LNG vessel operations and controls
- Cargo spill hazard analysis

Cryogenic Design Review

Initial preparation of *Cryogenic Design and Inspection Manual*

Ø Review design of:

- Marine Facilities
- Storage Tanks
- LNG Pumps
- LNG Vaporizers
- Compressors & Blowers
- Process Vessels
- Process Piping Systems
- Instrumentation & Controls
- Instrument Pneumatic System
- Electrical Systems
- Fuel Gas System
- Training, Operation & Emergency Procedures

Ø Compliance with DOT and NFPA safety requirements.

Ø Operational reliability.

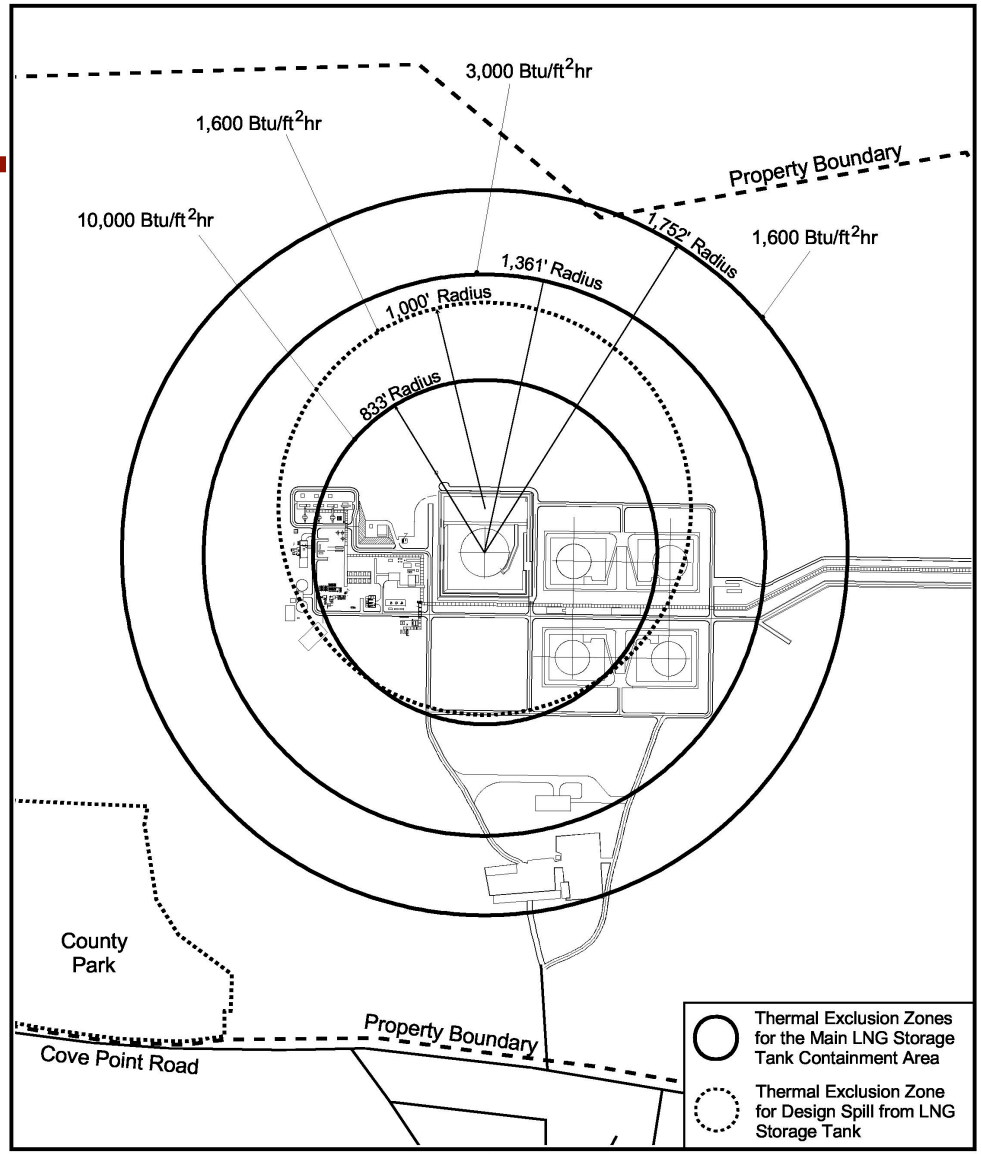
Ø Seismic design review.

Exclusion Zone Calculations

- Compliance with 49 CFR Part 193 and NFPA 59A
- Basis for calculating flammable vapor dispersion and thermal radiation distances.
- LNGFIREIII & DEGADIS Models

Tank Thermal Exclusion Zones

- The 1,600 Btu/ft^2-hr zone cannot impact outdoor assembly areas occupied by 50 or more people.
- The 3,000 Btu/ft^2-hr zone cannot extend to offsite structures used for occupancies or residences.
- The 10,000 Btu/ft^2-hr cannot cross a property line that can be built upon.



Sandia Report – Cargo Tank Breach Analysis

Accidental breach scenario conclusions:

- groundings and low speed collisions - no cargo spill
- high speed collisions - 0.5 to 1.5 m^2 cargo tank hole

Intentional breach scenario conclusions:

- cargo tanks holes range from 2 to 12 m^2
- nominal tank hole size of 5 – 7 m^2

Marine Hazard Calculations

LNG Release and Spread				
Hole Area	0.8 meters^2	5 meters^2	7 meters^2	12 meters^2
Hole Diameter	1.0 meter	2.5 meters	3.0 meters	3.9 meters
Spill Time	94 minutes	15 minutes	10.6 minutes	6.1 minutes
Pool Fire Calculations				
Maximum Pool Radius	340 feet	817 feet	935 feet	1,103 feet
Fire Duration	94 minutes	15 minutes	10.8 minutes	6.5 minutes
Distance to:				
1,600 BTU/ft2-hr	2,200 feet	4,340 feet	4,810 feet	5,476 feet
3,000 BTU/ft2-hr	1,710 feet	3,330 feet	3,701 feet	4,206 feet
10,000 BTU/ft2-hr	1,040 feet	1,970 feet	2,174 feet	2,459 feet

Security & Emergency Plans

- Facility security plan
- Facility physical requirements
- Marine security
- Vehicle and personnel access control to/within the facility
- Control of restricted areas
- Monitoring & detection
- Continuity of security
- Inspections and drills
- Liaison with federal and local authorities

Contact info

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