Federal Energy Regulatory Commission

Review of LNG Facilities

Citizen's Briefing- Robbinston, Maine
September 29, 2005

Who is FERC?

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

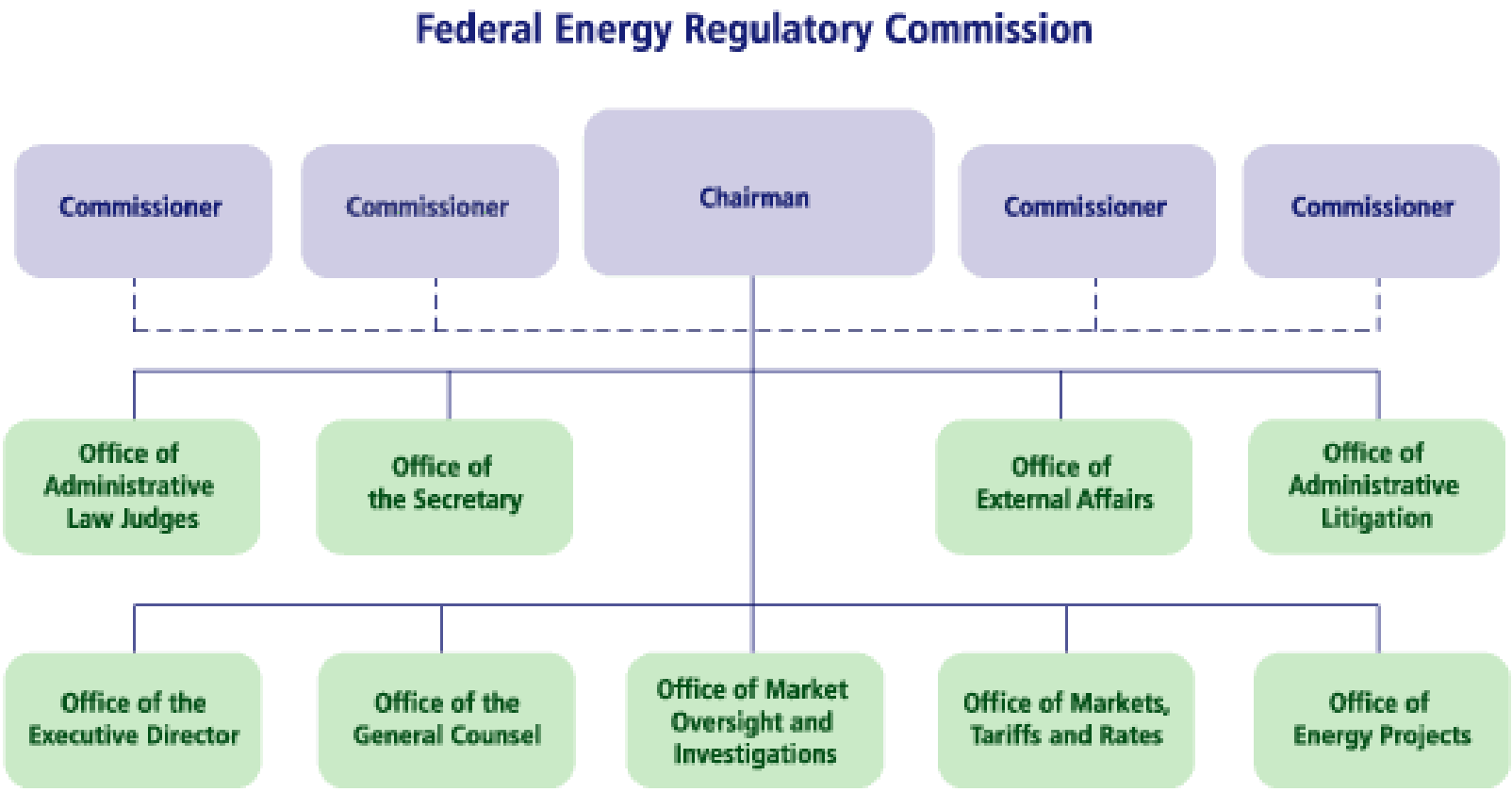
What does FERC regulate?

- Natural Gas
  - Interstate gas pipeline 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 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

How Are LNG Terminals Authorized?

- 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.

Safety?– How Important?

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

Existing, Proposed and Potential 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: 1.1 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)

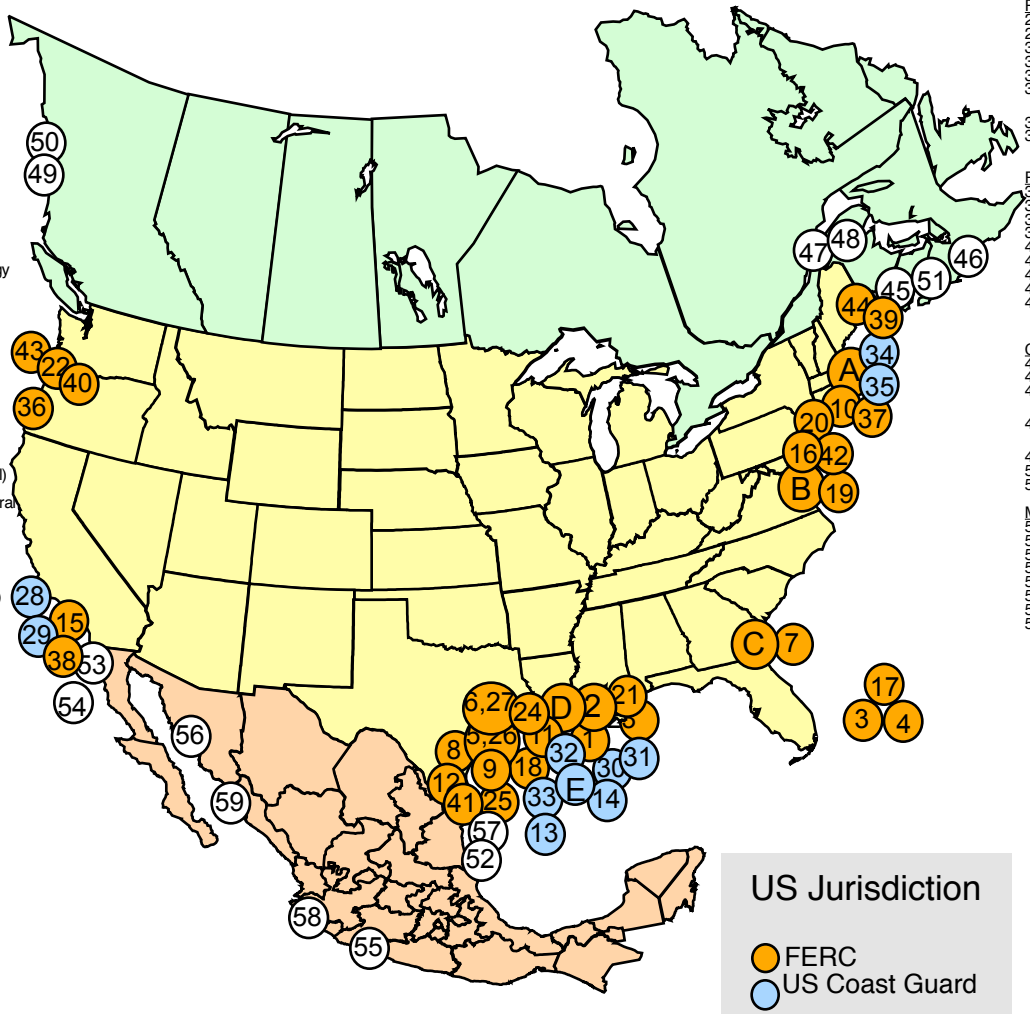
PROPOSED TO FERC
15. Long Beach, CA : 0.7 Bcfd (Mitsubishi/ConocoPhillips - Sound Energy Solutions)
16. Logan Township, NJ : 1.2 Bcfd (Crown Landing LNG - BP)
17. Bahamas : 0.5 Bcfd, (Seafarer - El Paso/FPL)
18. Port Arthur, TX: 1.5 Bcfd (Sempra)
19. Cove Point, MD : 0.8 Bcfd (Dominion)
20. LI Sound, NY: 1.0 Bcfd (Broadwater Energy - TransCanada/Shell)
21. Pascagoula, MS: 1.0 Bcfd (Gulf LNG Energy LLC)
22. Bradwood, OR: 1.0 Bcfd (Northern Star LNG - Northern Star Natural Gas LLC)
23. Pascagoula, MS: 1.3 Bcfd (Casotte Landing - ChevronTexaco)
24. Cameron, LA: 3.3 Bcfd (Creole Trail LNG - Cheniere LNG)
25. Port Lavaca, TX: 1.0 Bcfd (Calhoun LNG - Gulf Coast LNG Partners)
26. Freeport, TX: 2.5 Bcfd (Cheniere/Freeport LNG Dev. - Expansion)
27. Sabine, LA: 1.4 Bcfd (Cheniere LNG - Expansion)

PROPOSED TO MARAD/COAST GUARD
28. California Offshore: 1.5 Bcfd (Cabrillo Port - BHP Billiton)
29. So. California Offshore : 0.5 Bcfd (Crystal Energy)
30. Louisiana Offshore : 1.0 Bcfd (Main Pass McMoRan Exp.)
31. Gulf of Mexico: 1.0 Bcfd (Compass Port - ConocoPhillips)
32. Gulf of Mexico: 2.8 Bcfd (Pearl Crossing - ExxonMobil)
33. Gulf of Mexico: 1.5 Bcfd (Beacon Port Clean Energy Terminal - ConocoPhillips)
34. Offshore Boston, MA: 0.4 Bcfd (Neptune LNG - Tractebel)
35. Offshore Boston, MA: 0.8 Bcfd (Northeast Gateway - Excelerate Energy)

POTENTIAL SITES IDENTIFIED BY PROJECT SPONSORS
36. Coos Bay, OR: 0.13 Bcfd (Energy Projects Development)
37. Somerset, MA: 0.65 Bcfd (Somerset LNG)
38. California - Offshore: 0.75 Bcfd (Chevron Texaco)
39. Pleasant Point, ME : 0.5 Bcfd (Quoddy Bay, LLC)
40. St. Helens, OR: 0.7 Bcfd (Port Westward LNG LLC)
41. Galveston, TX: 1.2 Bcfd (Pelican Island - BP)
42. Philadelphia, PA: 0.6 Bcfd (Freedom Energy Center - PGW)
43. Astoria, OR: 1.0 Bcfd (Skipanon LNG - Calpine)
44. Robbinston, ME: 0.5 Bcfd (Downeast LNG - Kestrel Energy/Dean Girdis)

CANADIAN APPROVED AND POTENTIAL TERMINALS
45. St. John, NB : 1.0 Bcfd (Canaport - Irving Oil)**
46. Point Tupper, NS 1.0 Bcfd (Bear Head LNG - Anadarko)**
47. Quebec City, QC : 0.5 Bcfd (Project Rabaska - Enbridge/Gaz Met/Gaz de France)
48. Rivière-du- Loup, QC: 0.5 Bcfd (Cacouna Energy - TransCanada/PetroCanada)
49. Kitimat, BC: 0.61 Bcfd (Galveston LNG)
50. Prince Rupert, BC: 0.30 Bcfd (WestPac Terminals)
51. Goldboro, NS 1.0 Bcfd (Keltic Petrochemicals)

MEXICAN APPROVED AND POTENTIAL TERMINALS
52. Altamira, Tamulipas : 0.7 Bcfd (Shell/Total/Mitsui)**
53. Baja California, MX : 1.0 Bcfd (Sempra)**
54. Baja California - Offshore : 1.4 Bcfd (Chevron Texaco)**
55. Lázaro Cárdenas, MX : 0.5 Bcfd (Tractebel/Repsol)
56. Puerto Libertad, MX: 1.3 Bcfd (Sonora Pacific LNG)
57. Offshore Gulf, MX: 1.0 Bcfd (Dorado - Tidelands)
58. Manzanillo, MX: 0.5 Bcfd
59. Topolobampo, MX: 0.5 Bcfd



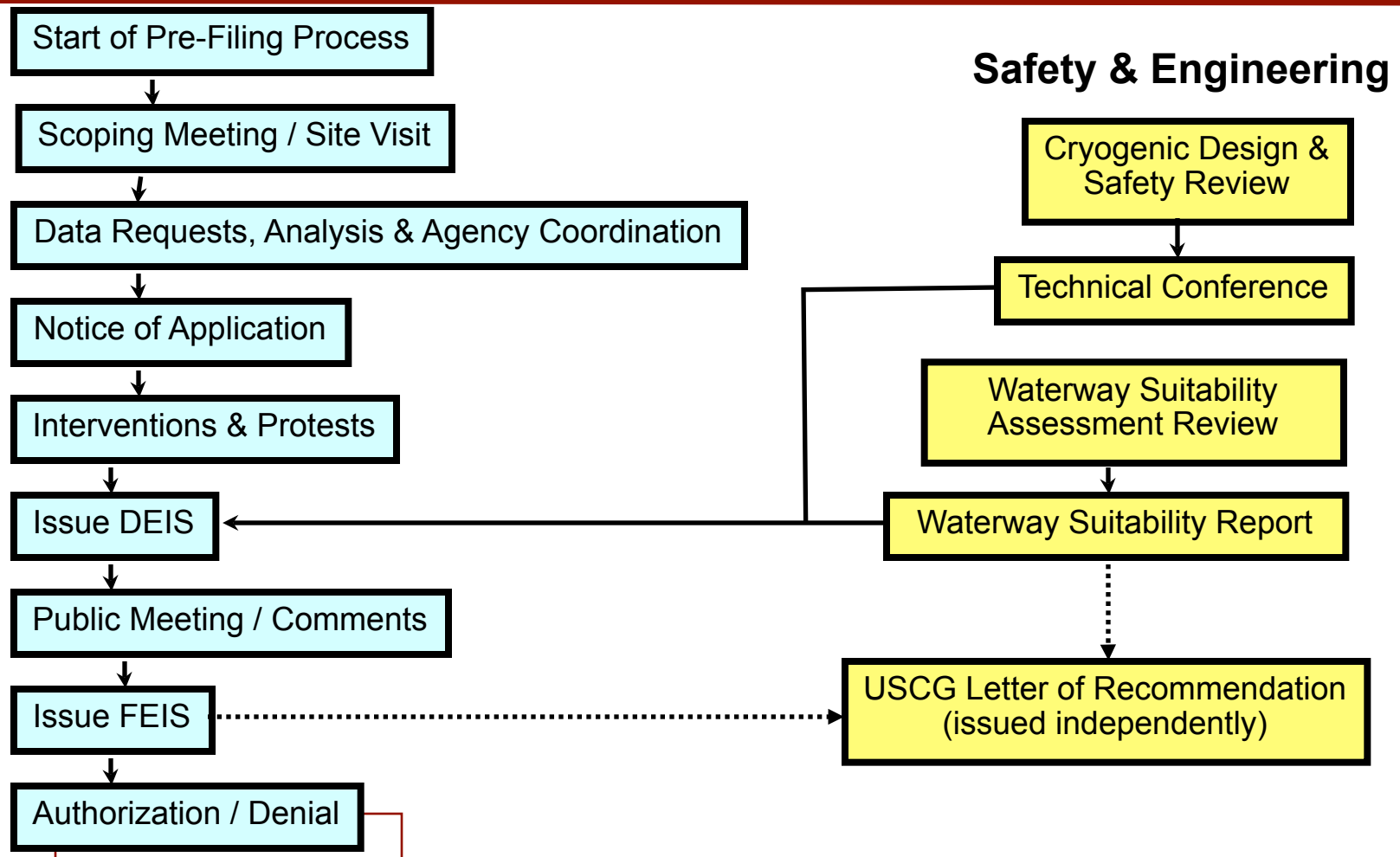
* *US pipeline approved; LNG terminal pending in Bahamas*
** *These projects have been approved by the Mexican and Canadian authorities*

As of August 22, 2005

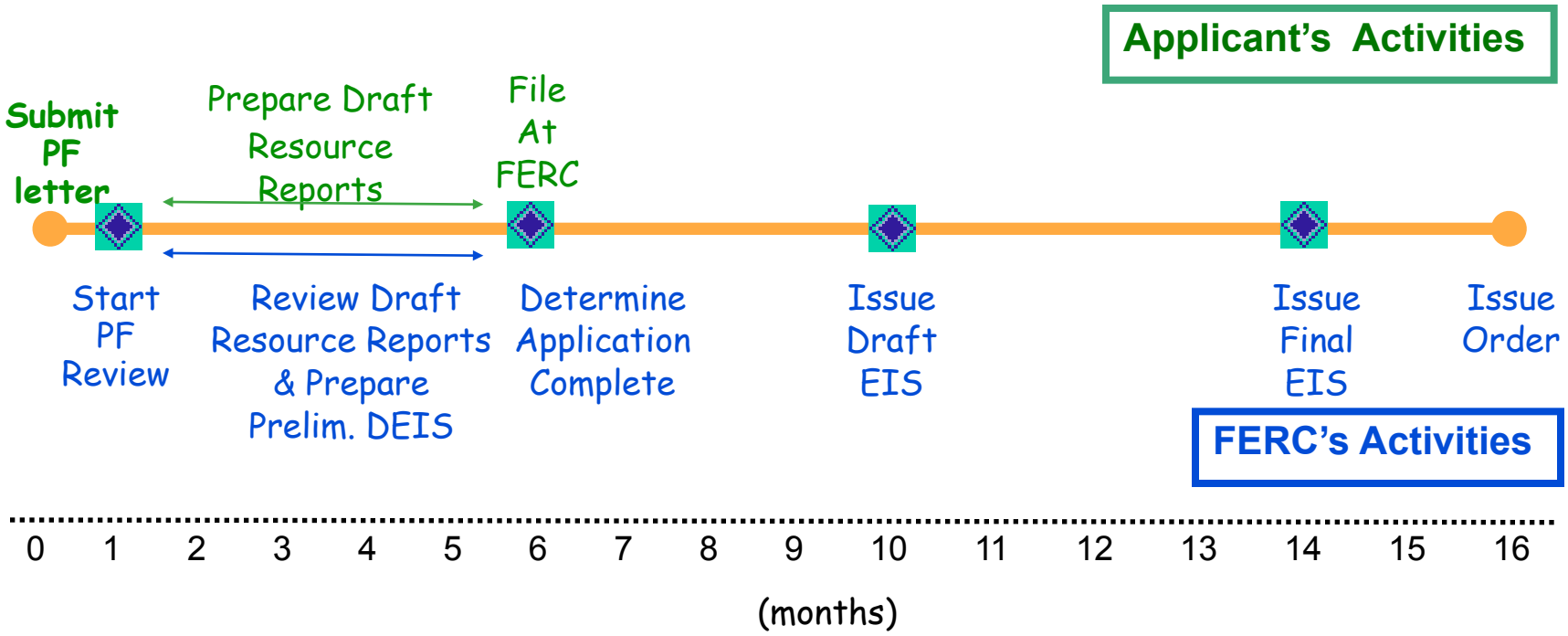
FERC, DOT and the U.S. Coast Guard

- 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
- 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 affect 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

FERC staff will be an advocate for the process, not the project

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

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

Environmental Report

- Required for all LNG projects
- 18 CFR 380.12 establishes minimum filing requirements
  - Use Appendix A checklist to avoid rejection
- Guidance Manual for Environmental Report Preparation provides more information
  - Designed to minimize data requests

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

FERC's Role

- FERC will:
  - Include in the DEIS a summary of the USCG's report of the WSA
  - Include in the EIS, as needed, conditions to address:
    - Completion of the WSA process
    - Annual review of the WSA
    - Applicant's plan for funding of resources needed for safety and security
    - Evacuation plans

Applicant's NVIC Role

- Submit an LOI and Preliminary WSA to the cognizant Coast Guard COTP/FMSC.
- Work with the USCG and Maritime Area Security Committees to refine WSA.
- Complete a Follow-on WSA and provide it the COTP/FMSC for review and validation.

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.

Safety Systems

- Pressure Relief and Vent Systems
  - Ø Locally Vented vs. Manifold
  - Ø Relief Valve Inspection and Test Frequency
  - Ø Piping Materials
  - Ø Questionable Relieving Capacity or Location
  - Ø Inappropriate Relief Valve Orientation/ Discharge

Safety Systems

- Spill Containment Systems
  - Ø Storage Tank, Process Equipment, Transfer Areas, and Plant Piping
  - Ø Impoundment Configuration
  - Ø Sizing Criteria
  - Ø Surface Material
  - Ø Provisions for Water Drainage

Safety Systems

- Hazard Detection Systems
  - Ø Direct/remote visual monitoring
  - Ø Automatic detection
    - Combustible gas
    - Smoke
    - Low Temperature
    - UV/IR
    - High Temperature
  - Ø Centralized alarm system
  - Ø Emergency shut down system (ESD)

Safety Systems

- Hazard Control Systems
  - Ø High Expansion Foam System
  - Ø Portable Fire Extinguishers
  - Ø Dry Chemical Extinguishers
  - Ø Fireproofing

Safety Systems

- Fire Water Systems
  - Ø Firewater Sources
  - Ø System Layout / Design
  - Ø Coverage of Hydrants/Monitors
  - Ø Deluge protection

Safety Systems

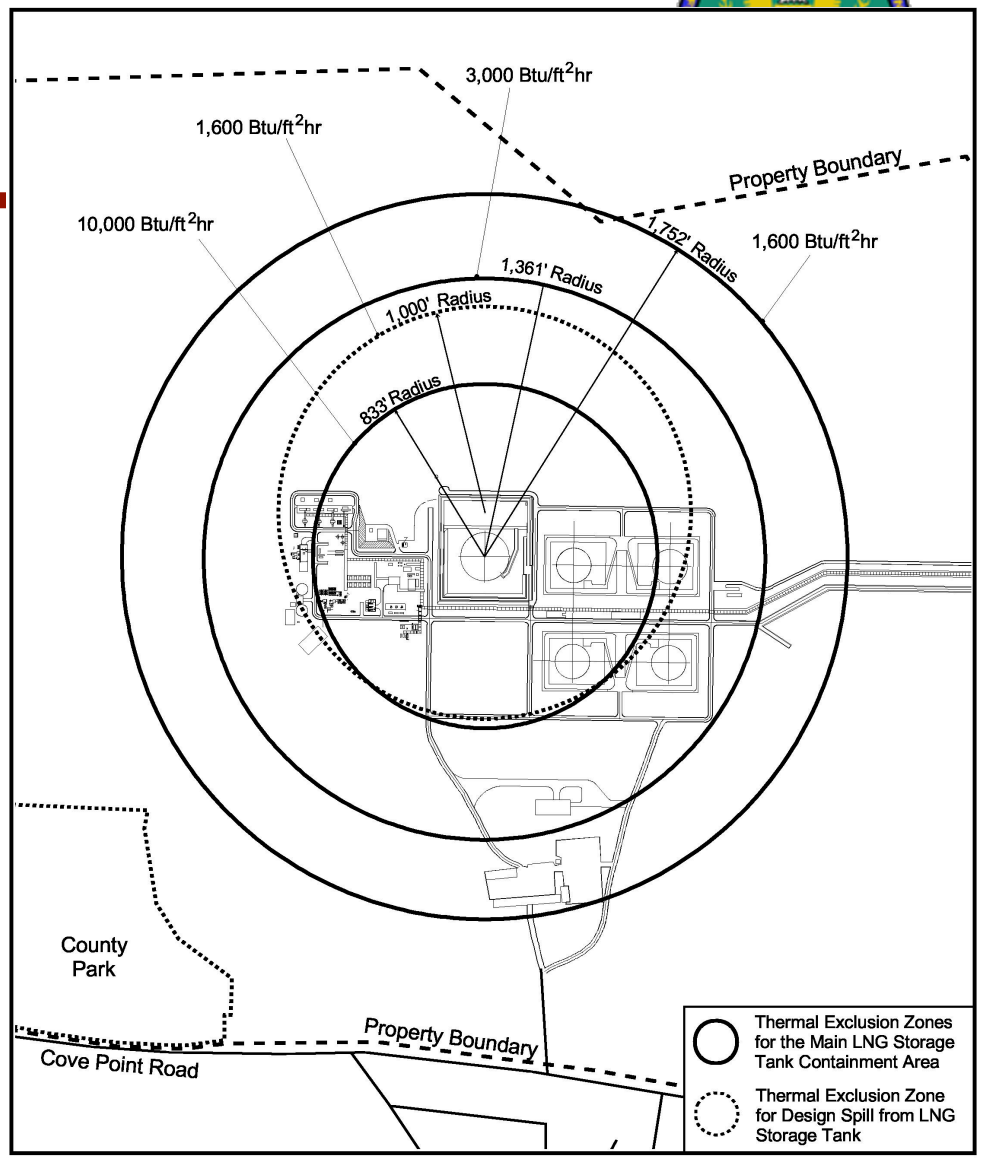
- Emergency Shutdown System
  - Ø Shutdown Event categories
  - Ø Zone Identification
  - Ø Equipment De-Energized
  - Ø Automatic/Manual Actuation
  - Ø Frequency of system testing

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

Thermal Exclusion Zone

- 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.



Effects of Thermal Radiation on People and Structures

Btu/ft^2-hr	kW/m^2	Effects
1,600 seconds;	5.0	2nd degree burns in 30 Hazardous for persons located outdoors and unprotected.
3,000	9.5	Acceptable level for wooden structures.
4,000	12.5	Ignition of wooden structures.
10,000	31.3	Damage to process equipment.
12,000	37.5	Damage to steel structures.

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

Sandia Report – Some Key Findings on Damage Scenarios

- Cascading damage due to brittle fracture from exposure to cryogenic liquid or fire-induced damage to foam insulation not likely to involve more than two or three cargo tanks.
- Cascading events are not expected to increase the overall fire hazard by more than 20 to 30 percent (1,920 to 2,080 meters) (6,300 to 6,825 feet), but will increase the expected fire duration.
- Rapid phase transitions are possible for large spills but the effects will be localized near the spill source and should not cause extensive structural damage.

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

Richard R. Hoffmann, Director
Division of Gas – Environment and Engineering
Office of Energy Projects, FERC
888 1st St., N.E.
Washington, DC 20426

richard.hoffmann@ferc.gov
202-502-8066