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# LNG, FERC's Model, and Going Forward

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**July 13, 2004**

# Project Status...

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Cameron LNG – Started construction of LNG facility in June 2004

Freeport LNG – Proposes start of construction of LNG facility in Summer 2004



# Project Status...

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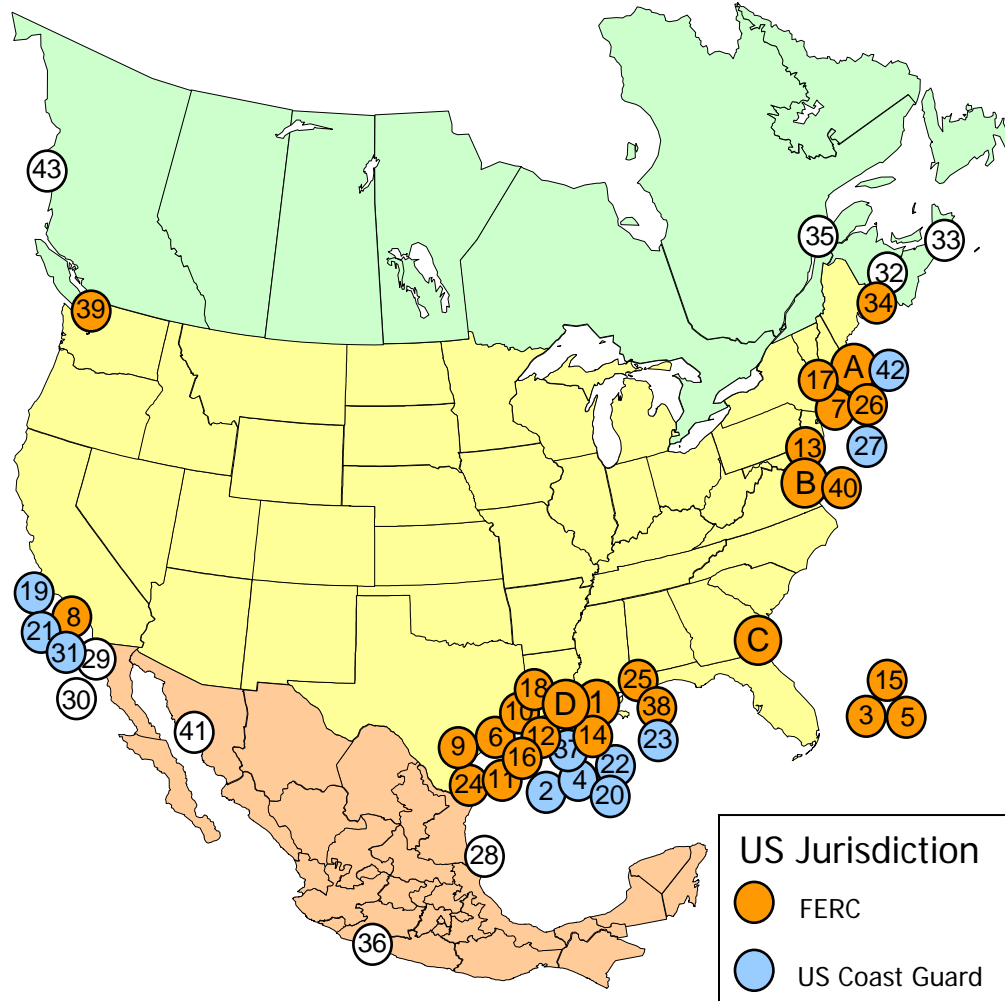
## Pre-Filing:

- Exxon Mobil, Golden Pass (PF04-1-000)
- BP, Crown Landing (PF04-2-000)
- Exxon Mobil, Vista del Sol (PF04-3-000)
- Occidental Energy, Ingleside (PF04-09-000)
- Sempra, Port Arthur (PF04-11-000)
- Seafarer Pipeline, FL (PF04-08)

## Applications Filed:

- Weaver's Cove (CP04-36-000)
- Cheniere, Corpus Christi (CP04-37-000)
- Cheniere, Sabine Pass (CP04-47-000)
- Sound Energy Solutions (CP04-58-000)
- Keyspan (CP04-223-000)

# Existing and Proposed North American LNG Terminals



June 2004

Office of Energy Projects

**Existing Terminals with Approved Expansions**

- A. Everett, MA : 1.035 Bcfd (Tractebel – DOMAC)
- B. Cove Point, MD : 1.0 Bcfd (Dominion – Cove Point LNG)
- C. Elba Island, GA : 1.2 Bcfd (El Paso – Southern LNG)
- D. Lake Charles, LA : 1.2 Bcfd (Southern Union – Trunkline LNG)

**Approved Terminals**

- 1. Hackberry, LA : 1.5 Bcfd, (Sempra Energy)
- 2. Port Pelican: 1.6 Bcfd, (Chevron Texaco)
- 3. Bahamas : 0.84 Bcfd, (AES Ocean Express)\*
- 4. Gulf of Mexico: 0.5 Bcfd, (El Paso Energy Bridge GOM, LLC)
- 5. Bahamas : 0.83 Bcfd, (Calypso Tractebel)\*
- 6. Freeport, TX : 1.5 Bcfd, (Cheniere/Freeport LNG Dev.)

**Proposed Terminals and Expansions – FERC**

- 7. Fall River, MA : 0.8 Bcfd, (Weaver's Cove Energy/Hess LNG)
- 8. Long Beach, CA : 0.7 Bcfd, (SES/Mitsubishi)
- 9. Corpus Christi, TX : 2.6 Bcfd, (Cheniere LNG Partners)
- 10. Sabine, LA : 2.6 Bcfd (Cheniere LNG)
- 11. Corpus Christi, TX : 1.0 Bcfd (Vista Del Sol - ExxonMobil)
- 12. Sabine, TX : 1.0 Bcfd (Golden Pass - ExxonMobil)
- 13. Logan Township, NJ : 1.2 Bcfd (Crown Landing LNG – BP)
- 14. Lake Charles, LA: 0.6 Bcfd (Southern Union – Trunkline LNG)
- 15. Bahamas : 0.5 Bcfd, (Seafarer - El Paso/FPL )
- 16. Corpus Christi, TX: 1.0 Bcfd (Occidental Energy Ventures)
- 17. Providence, RI : 0.5 Bcfd (Keyspan & BG LNG)
- 18. Port Arthur, TX: 1.5 Bcfd (Sempra)

**Proposed Terminals – Coast Guard**

- 19. California Offshore: 1.5 Bcfd, (Cabrillo Port – BHP Billiton)
- 20. Louisiana Offshore : 1.0 Bcfd (Gulf Landing – Shell)
- 21. So. California Offshore : 0.5 Bcfd, (Crystal Energy)
- 22. Louisiana Offshore : 1.0 Bcfd (Main Pass McMoran Exp.)
- 23. Gulf of Mexico: n/a (Compass Port - ConocoPhillips)

**Planned Terminals and Expansions**

- 24. Brownsville, TX : n/a, (Cheniere LNG Partners)
- 25. Mobile Bay, AL: 1.0 Bcfd, (ExxonMobil)
- 26. Somerset, MA : 0.65 Bcfd (Somerset LNG)
- 27. Belmar, NJ Offshore : n/a (El Paso Global)
- 28. Altamira, Tamulipas : 1.12 Bcfd, (Shell)
- 29. Baja California, MX : 1.0 Bcfd, (Sempra & Shell)
- 30. Baja California - Offshore : 1.4 Bcfd, (Chevron Texaco)
- 31. California - Offshore : 0.5 Bcfd, (Chevron Texaco)
- 32. St. John, NB : 0.5 Bcfd, (Canaport – Irving Oil)
- 33. Point Tupper, NS : 1.0 Bcf/d (Bear Head LNG - Access Northeast Energy)
- 34. Pleasant Point, ME : 0.5 Bcf/d (Quoddy Bay, LLC)
- 35. St. Lawrence, QC : n/a (Enbridge/Gaz Met)
- 36. Lázaro Cárdenas, MX : 0.5 Bcfd (Tractebel/Repsol)
- 37. Gulf of Mexico : 1.0 Bcfd (Pearl Crossing - ExxonMobil)
- 38. Mobile Bay, AL: 1.0 Bcfd (Cheniere LNG Partners)
- 39. Cherry Point, WA: 0.5 Bcfd (Cherry Point Energy LLC)
- 40. Cove Point, MD : 0.8 Bcfd (Dominion)
- 41. Puerto Libertad, MX: 1.3 Bcfd (Sonora Pacific LNG)
- 42. Offshore Boston, MA: 0.8 Bcfd (Northeast Gateway – Excelerate Energy)
- 43. Kitimat, BC: 0.34 Bcfd (Galveston LNG)

\* US pipeline approved; LNG terminal pending in Bahamas

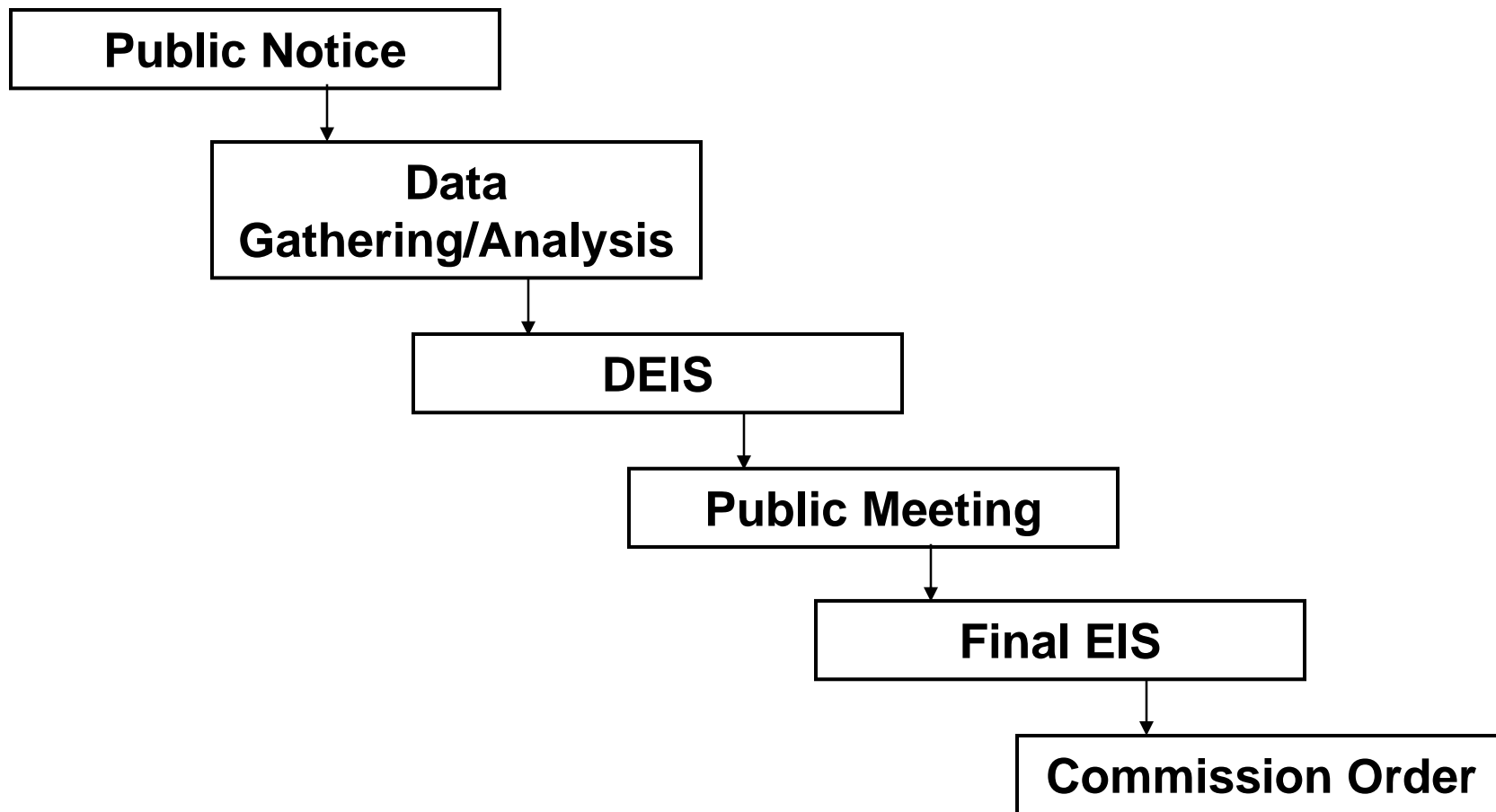
# How Are LNG Terminals Authorized?

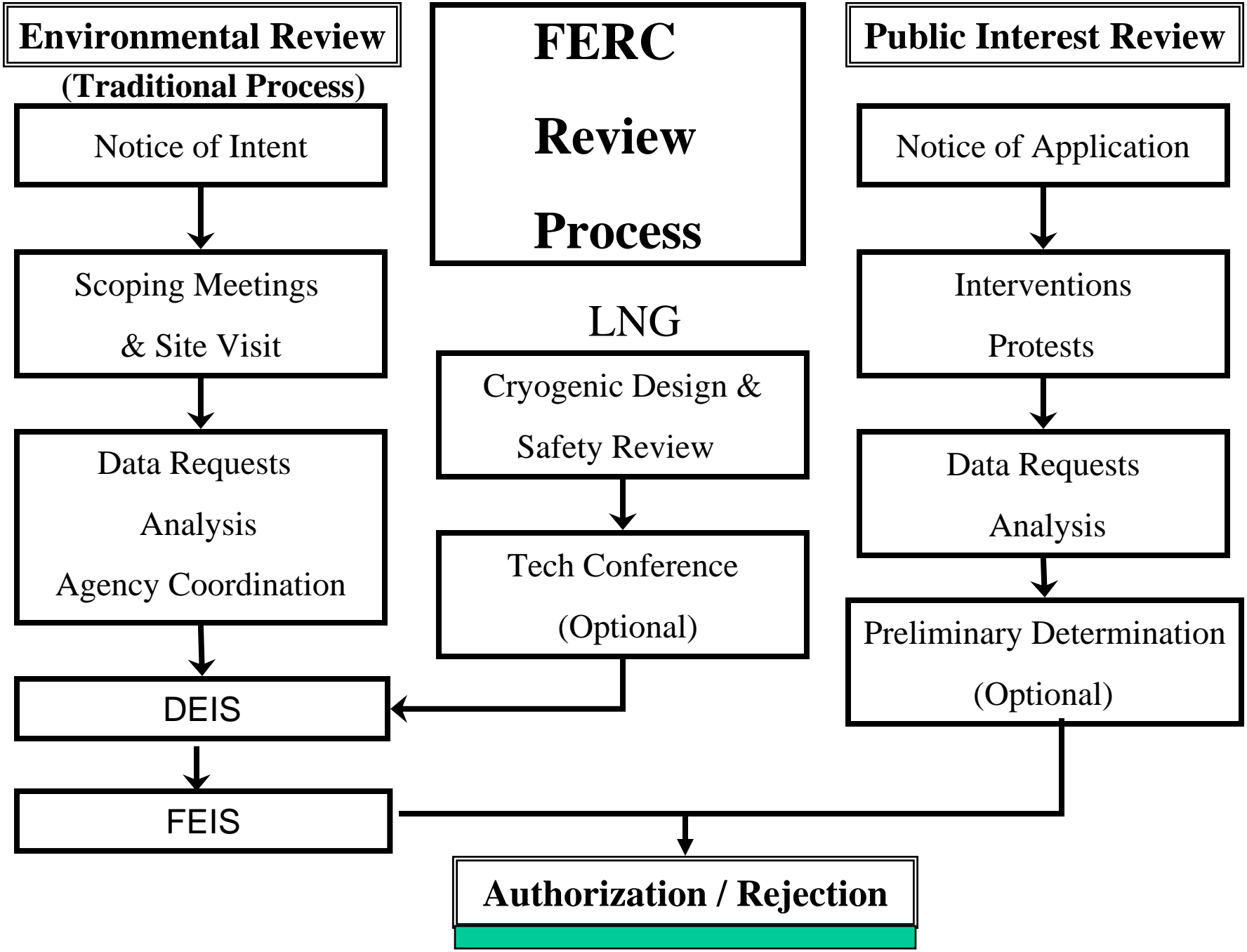
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- FERC Review Process
- Pre-Filing Process

# FERC Review Process





# Opportunities for Public Involvement



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## The FERC Process:

- We Issue Notice of the Application
- Project Sponsor Sends Landowner Notification Package
- SCOPING = We Issue Notice of Intent to Prepare the NEPA Document
- Public Meeting(s)

## Public Input:

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

# Opportunities for Public Involvement



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## The FERC Process:

- Issue Notice of Availability of the DEIS
- 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

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- 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



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1. **General Project Description**
  2. **Water Use and Quality**
  3. **Fish, Wildlife, and Vegetation**
  4. **Cultural Resources**
  5. **Socioeconomics**
  6. **Geological Resources**
  7. **Soils**
  8. **Land Use, Recreation, and Aesthetics**
  9. **Air and Noise Quality**
  10. **Alternatives**
  11. **Reliability and Safety**
  12. **PCB Contamination**
  13. **Additional Information Related to LNG Facilities**

# Interagency Agreements



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- IA for Environmental Review of Natural Gas Facilities
    - Signed May 2002
    - Working Group Established
    - FERC chairs working group
    - Each participating agency developed internal agency guidance
    - Group working on survey to get feedback on implementation experiences/success

# Interagency Agreements



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- IA for LNG Safety and Security
    - Signed January 2004 by FERC, USCG, DOT
    - Defines roles and responsibilities
    - Establishes FERC as lead for NEPA review
    - Stresses coordination, seamless review
    - Coordination continues from initial review through construction and operation
    - Includes terminal facilities and ships

# Interagency Cooperation – What Are The Agencies Doing?

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- May 2002 Pipeline Agreement
- LNG Safety and Security Agreement
- Deepwater Port Act Agreement
- PSIA Agreement
- DOT CATS Program
- Interagency Training
- Increased Efforts Regarding Cooperating Agencies, Federal and State

# “Expedite” the NEPA Pre-Filing Process?

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- Projects Can Be Expedited Only If
  - The company follows the NEPA Pre-Filing guidelines;
  - Public involvement is made an integral part of the project planning process;
  - The company works in partnership with the agencies; and
  - The project is **READY** to move forward.

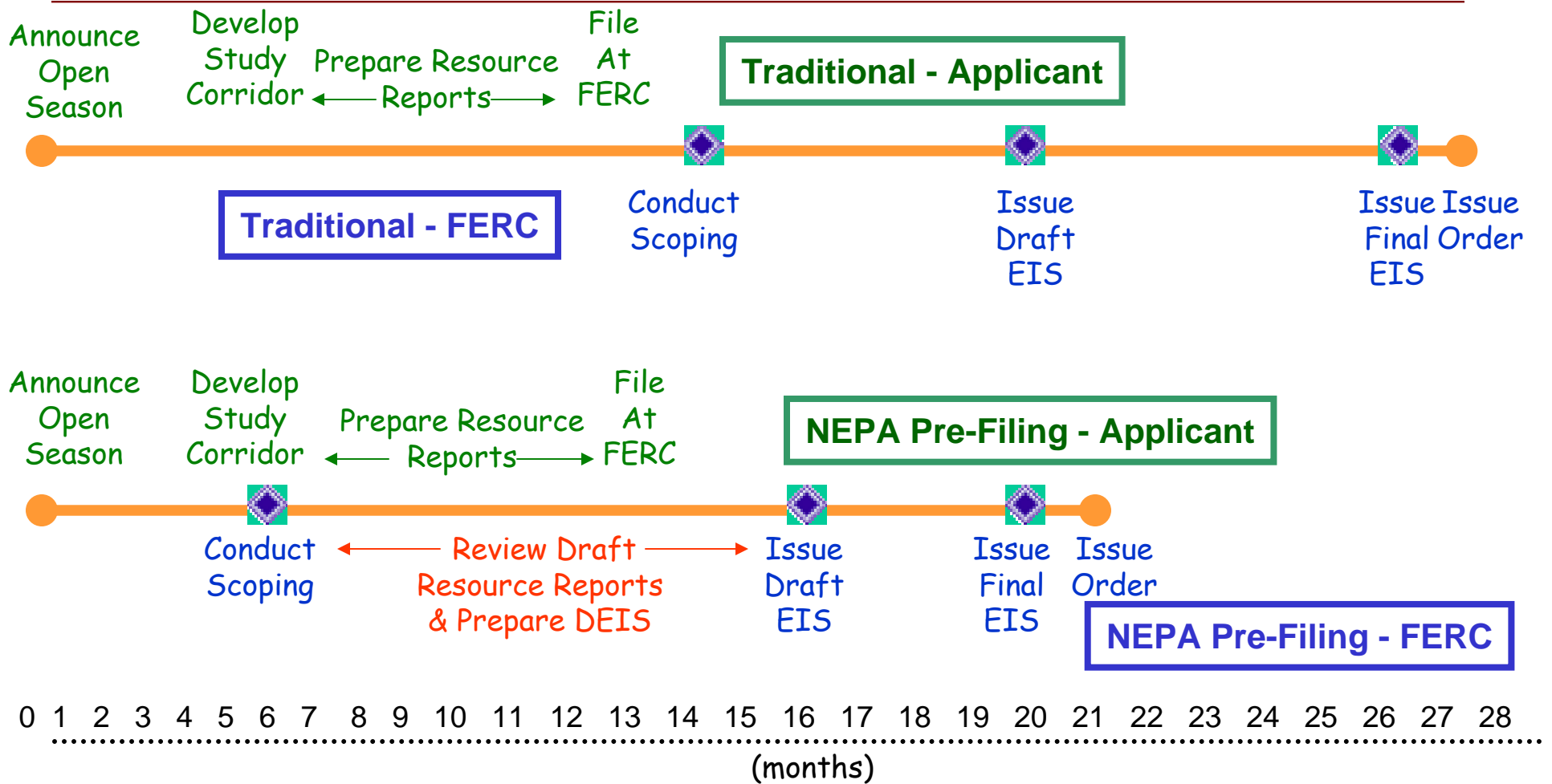
# Benefits of NEPA Pre-Filing

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- More interactive NEPA process, no shortcuts
- Earlier, more direct involvement by FERC, other agencies, landowners
- Goal of “no surprises”
- Time savings realized only if we are working together with stakeholders
- FERC staff is an advocate of the Process, not the Project!

# Traditional vs. NEPA Pre-Filing Process





# ABS Study

Purpose: to recommend modeling methods for FERC staff in calculating site-specific hazards of LNG import terminal applications

Provides methods for estimating:

- spill rates from various sized cargo tank holes;
- pool spread and vapor generation for unconfined LNG spills on water;
- thermal radiation from LNG pool fires on water; and
- dispersion of flammable vapors

# Our Model & Its Positive Impacts

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- Provides FERC the methodology to perform site specific marine safety reviews.
- Provides a solid theoretical foundation from which to build on as new information becomes available.
- Set the floor by providing conservative calculations.
- FERC is moving forward with projects in parallel with refining the study.

# Models Used

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- Orifice model
- Pool spread
- Vapor generation
- Thermal radiation
- Flammable vapor cloud dispersion

# ABS Study



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Notice of Availability: issued May 14, 2004, with comments due on May 28, 2004.

Comments on the report were filed by:

- 22 individuals
- 9 industry groups
- 3 local governments
- 3 environmental organizations
- 12 from the scientific community

## FERC's Responses to Comments :



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- Responses noticed and posted 6-18-04
  - Model adjusted in numerous areas.
  - Some adjustments made it less conservative; some made it more
  - Worst case hazard distances are not equivalent to exclusion zones

## FERC's Responses to Comments :



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- Model results will be applied in each FERC EIS.
  - The study also reviews the protections built into tankers and their operations
  - Study did not compare LNG with other hazardous cargo in other ships.
  - As models advance, we will incorporate improvements.
  - Tweaks = discharge coef; pool shape; pool friction; spill rate; heat flux; and fire model.

# FERC's Model



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## Next steps:

- FERC staff applying models
- New technical information will be evaluated and applied to improve methodology when it becomes available.
- Future refinement includes:
  - improve modeling as it becomes available;
  - & improvements on site-specific analyses



<b>Table - LNG Spills on Water</b>		
<b>LNG Release and Spread</b>		
Hole diameter	1 meter	2 ½ meters
Spill time	94 minutes	15 minutes
<b>Pool Fire Calculations</b>		
Maximum pool radius	340 feet	816 feet
Fire duration	94 minutes	15 minutes
Distance to:		
1,600 Btu/ft <sup>2</sup> -hr	2,200 feet	4,340 feet
3,000 Btu/ft <sup>2</sup> -hr	1,680 feet	3,260 feet
10,000 Btu/ft <sup>2</sup> -hr	1,010 feet	1,910 feet

# Explosion at Skikda January 19, 2004

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## Preliminary findings:

- Initial explosion of high-pressure steam boiler caused by hydrocarbon leakage into combustion air fan
- Larger secondary explosion of the hydrocarbon vapors in the immediate vicinity.

March 13 – 15, 2004 – FERC / DOE Team inspected accident site and interviewed Sonatrach.

FERC / DOE Report being shared with Algeria for review before release.

## Lessons Learned...



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Major differences with U.S. facilities, but potential failure modes warrant further evaluation:

- Proximity of combustion/ventilation air intake equipment to any possible hydrocarbon release
- Hazard detection devices to isolate or shutdown any combustion equipment

Review of all jurisdictional LNG facilities in progress

# Richard Hoffmann



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