



Baltimore County Liquefied Natural Gas Task Force

AES Sparrows Point LNG
Mid-Atlantic Express
Project Presentation

September 5, 2006

AES Provides Power World Wide

- Wind
- Hydro
- Solar
- Natural Gas
- Oil
- Coal – AES operates Maryland's cleanest coal-fired power plant in Cumberland, called Warrior Run; the plant has been operating for five years.

Legislation Preamble

- Demand in U.S. for natural gas for residential and industrial use and for power generation is increasing rapidly.
- U.S. now relies on natural gas for nearly one quarter of its energy use.
- Projections indicate that consumption will soon outpace domestic production.
- Technology makes importation of natural gas in liquefied form feasible + cost effective, and imports of LNG are expected to sharply increase in the next decade.
- Public has compelling interest in obtaining **COMPREHENSIVE, FACTUAL, AND OBJECTIVE INFORMATION** about LNG facility proposed at Sparrows Point.
- Task Force shall be formed to obtain **OBJECTIVE AND ACCURATE INFORMATION** about proposed LNG project, including safety and other important aspects surrounding siting decisions.

Task Force Mission

- To study and report on the following:
 - Risks and hazards of LNG facility
 - Kind and use of facility
 - Population and demographic characteristics of the community
 - Land use
 - Natural and physical aspects of proposed location
 - Emergency response capabilities
 - Need and distance for remote siting
 - Effect of facility on recreational and commercial boating, fishing, crabbing
 - Impact on environment / water quality due to dredging
 - Waterway access for residential property owners

2005 Energy Policy Act

- Section 311(d) of the Energy Policy Act added a new Section 3A(b) to the Natural Gas Act that requires FERC to review:
 - Kind and use of the facility
 - Existing and projected population and demographic characteristics of the location
 - Existing and proposed land use near the location
 - Natural and physical aspects of the location
 - Emergency response capabilities near the facility location
 - Need to encourage remote siting

Project Timing

- Voluntary Community Outreach
 - Elected Officials
 - Community Leaders
 - Public Presentation – January 17, 2006
 - Public / Community presentations – January through May 2006
- Pre-Application Process
 - April 3, 2006 – FERC issued notice of commencement of pre-filing review process
 - Minimum 180 day period to initiate and complete studies and prepare reports that present site-specific results
 - Scoping meetings and continued outreach
- Formal Application
 - Submitted after completion of studies and reports
 - Expected to be filed December 2006

FERC Process

- FERC has exclusive authority to approve or deny application
- Encourages cooperation with state and local officials and early public involvement
- Anticipated schedule
 - Submit first drafts of resource reports: August / September 2006
 - Respond to data requests and revise resource reports: September / October / November 2006
 - Formal application: December 2006
 - Draft EIS: 2Q 2007
 - Final EIS: 3Q 2007
 - Authorization and certificate: 4Q 2007

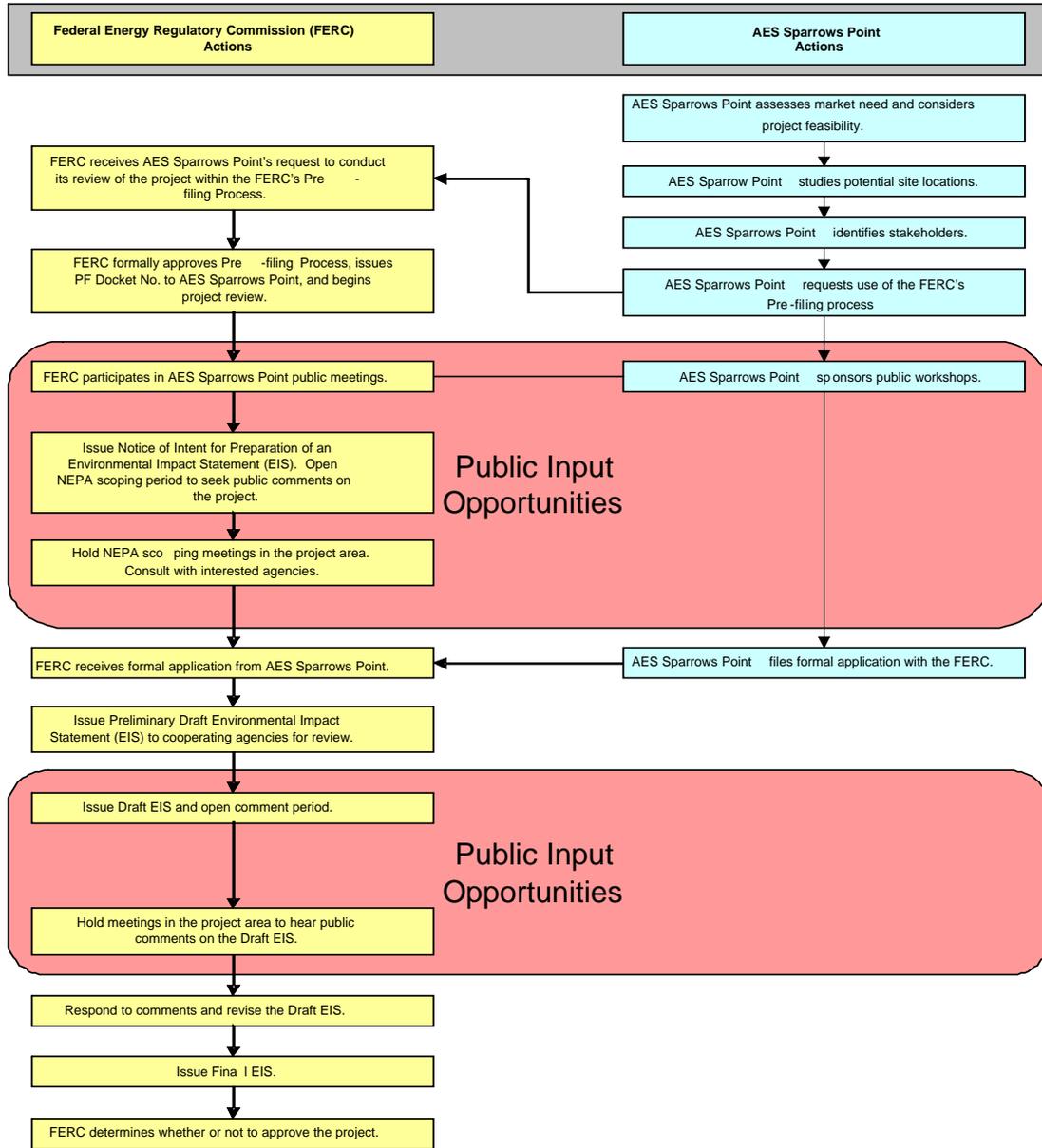
FERC Process

- Resource reports
 - (1) water use and quality
 - (2) fish, wildlife, and vegetation
 - (3) cultural resources
 - (4) socio-economics
 - (5) geological resources
 - (6) soils
 - (7) land use, recreation, and aesthetics
 - (8) air quality & noise
 - (9) alternatives
 - (10) safety, security, and reliability
 - (11) potential contamination issues
 - (12) PCB contamination
 - (13) engineering design



Sparrows Point Project

Federal Energy Regulatory Commission Environmental Review Process



USCG Process

- Preliminary Waterway Suitability Analysis
 - Port characterization
 - Risk assessment (safety and security)
 - Risk management strategies, including safety and security zones (current restrictions in Chesapeake Bay apply to cruise ships and all ships transporting cargos defined as hazardous), notice to mariners, and/or information hotline
 - Required resources and payment responsibility
- Follow-on Waterway Suitability Analysis
- Letter of Intent
- Letter of Recommendation
- Cooperating agency under FERC process
- ESTIMATED TIME OF DISLOCATION AS LNG SHIP PASSES ENROUTE TO SPARROWS POINT 5 MINUTES
- ESTIMATED TIME IN APPROACH CHANNEL AND TURNING BASIN 45 MINUTES
- NO WATERWAY CLOSURES

Project Overview

➤ IMPORT TERMINAL.

- Owner: AES Sparrows Point LNG, LLC
- Three 160,000 cubic meter storage tanks; expandable to four tanks depending on market demand
- Unloading pier capable of receiving two LNG ships
- Send-out capacity of 1.5 billion cubic feet of natural gas per day (BCFD), expandable to 2.25 BCFD
- \$400 million investment

➤ PIPELINE

- Owner: Mid-Atlantic Express, LLC.
- 87-mile route, mostly along existing utility corridors
- Connection to regional natural gas infrastructure with potential for connections to BGE
- \$250 million investment

PROJECT BENEFITS

➤ Regional Benefits

- Natural gas is environmentally preferred energy source – A CLEAN INDUSTRY
- Provides for diversity and stability of gas supply to the region
- Provides additional supply to local area and region to help stabilize or reduce price of natural gas and electric power
- Reduces costs by 15 to 30% over piped gas, according to June 12, 2006 WSJ article

PROJECT BENEFITS

➤ Local Benefits

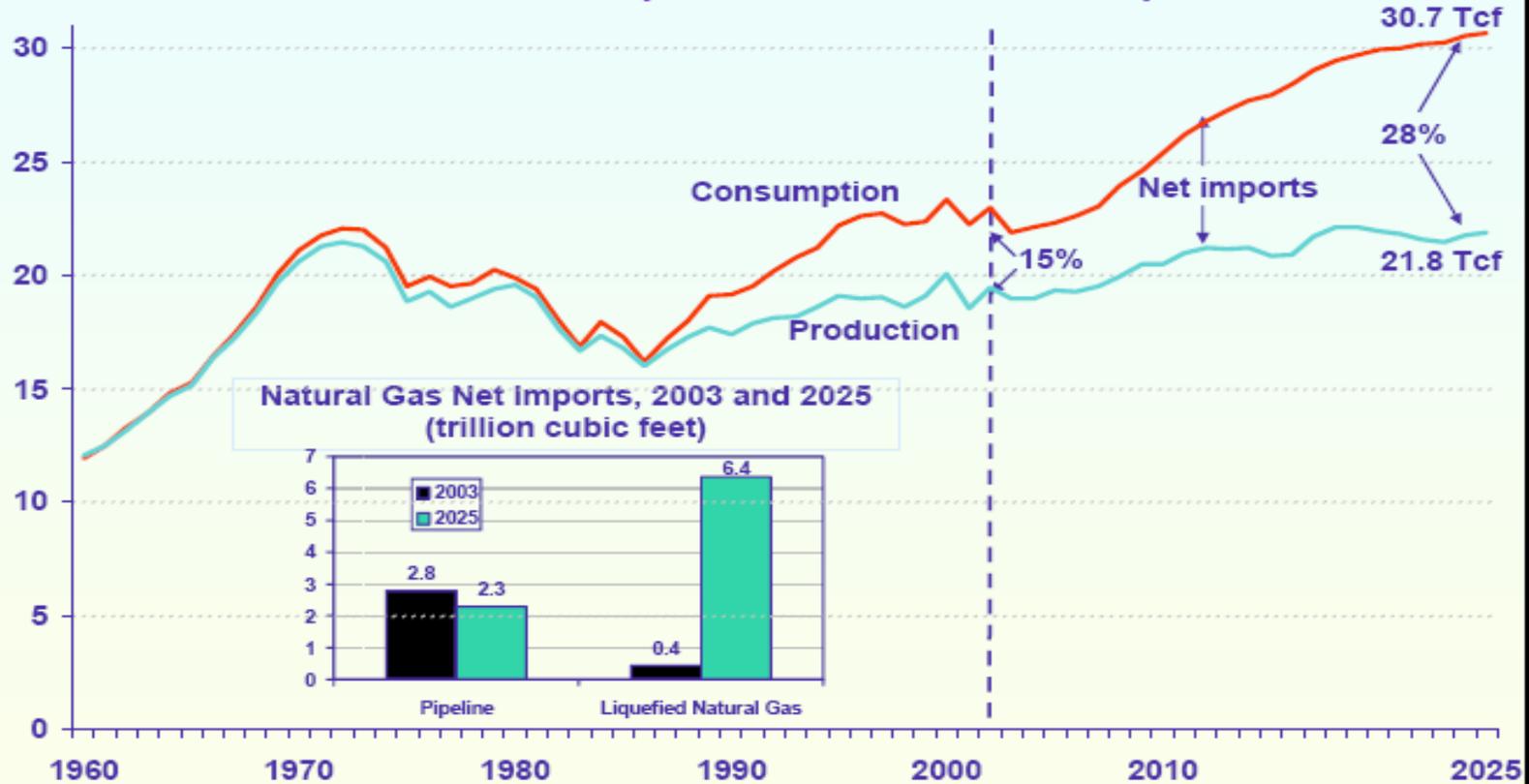
- State and local government tax revenue: **\$5+ million per year average**
- 500++ union construction jobs
- Direct and indirect / induced construction expenditures over 3 years: **\$130+ million**
- 50 to 60 permanent jobs
- Direct operating expenditures and indirect / induced business supports local vendors: **\$20+ million per year**
- Spin-off or compatible industry opportunities

Natural Gas

- New sources of natural gas needed to meet rising regional and national consumption; North American production cannot keep pace with increased demand for clean electric power, home heating and cooking, and industrial growth
 - Diversity of energy supply; exporting countries primarily non-OPEC.
- Natural gas sets price for electric power
 - In 2003, natural gas set the price for wholesale electricity in Mid-Atlantic Region 48 % of all hours. (Office of Market Oversight & Investigations)
 - Natural gas plants are expected to set margin during most on-peak periods. (Platts Power Markets Week – April 2005)

Natural Gas Use

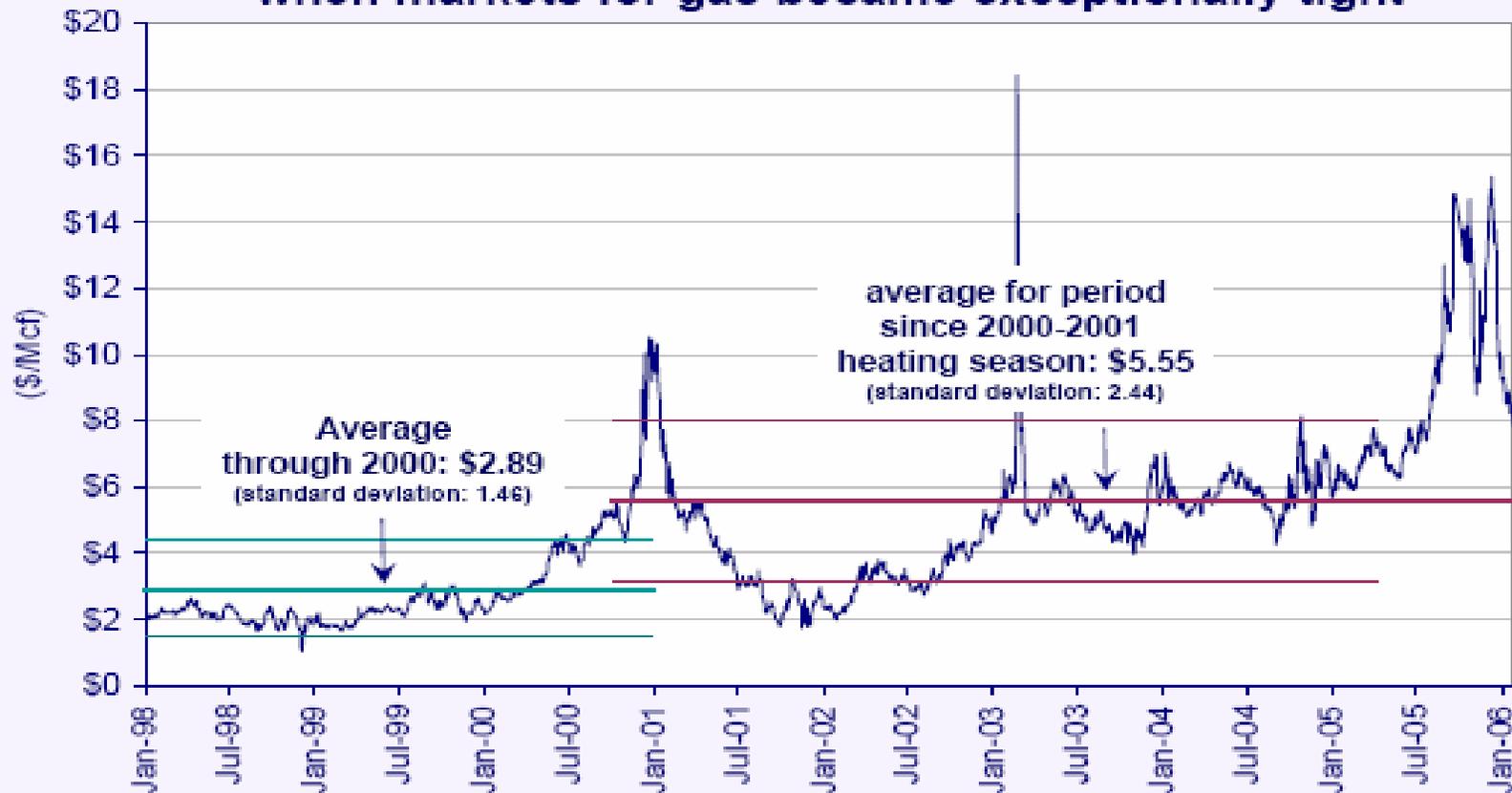
Natural Gas Production, Consumption, and Imports, 1960-2025 (trillion cubic feet)



Source: Annual Energy Outlook 2005

Natural Gas Pricing

Prices have changed dramatically since winter 2000-01 when markets for gas became exceptionally tight



Source: Intercontinental Exchange

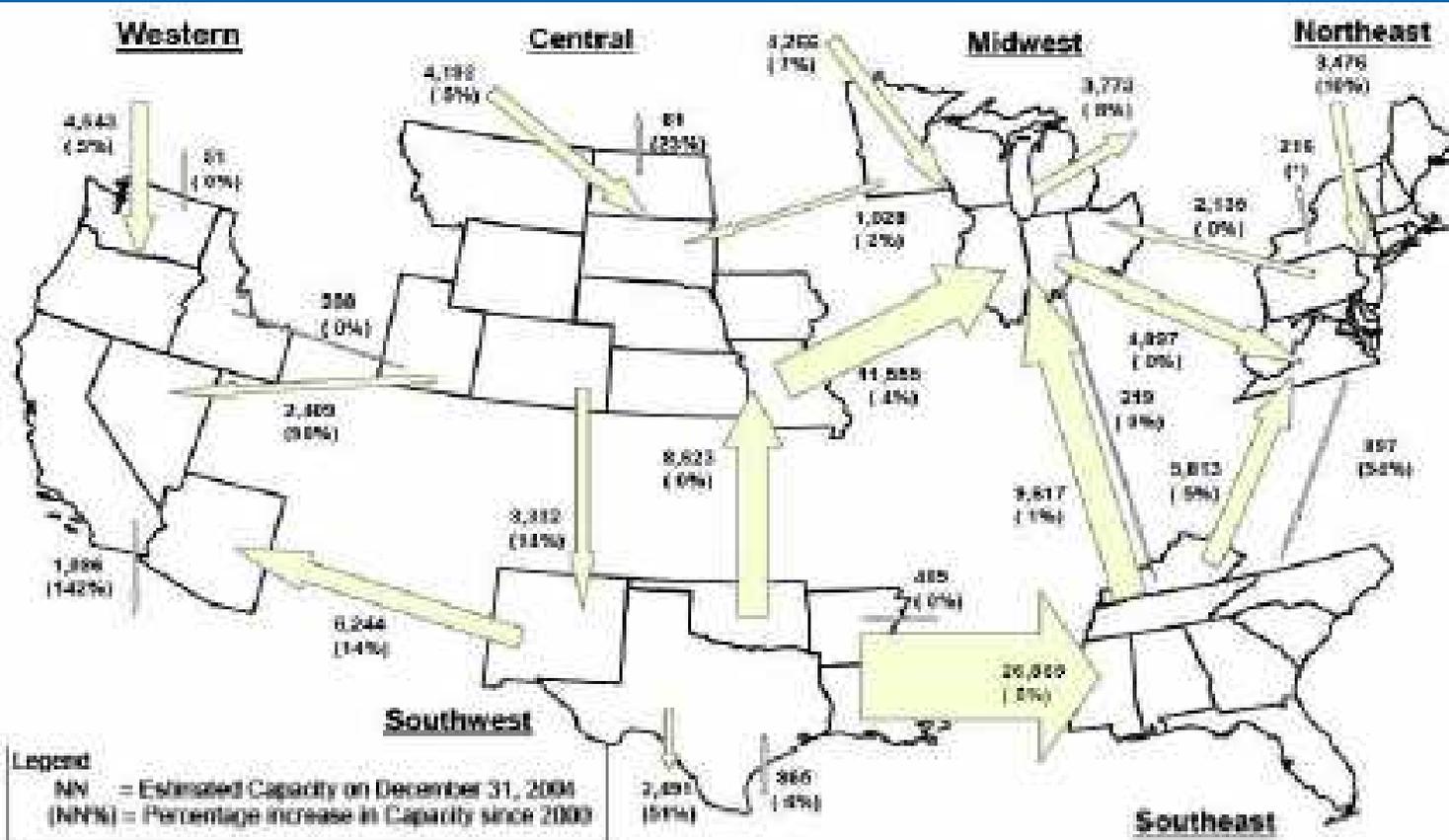
Natural Gas

- Introducing new supplies at point of demand avoids significant pipeline transportation charges and environmental impacts associated with multiple pipeline expansions
 - Interstate pipeline systems at or near capacity
 - Baltimore nearly as far away from sources as possible
 - Maryland receives most natural gas from the Gulf Coast and Canada
- Peak-shaving
 - Extra energy during cold snaps
 - Three peak-shaving tanks in Baltimore since 1970s
 - Parts of Inner Harbor, Ravens and Camden Yards Stadiums, and much of Baltimore's business community within 1 mile of LNG tanks
 - MDE is 1.2 miles from the LNG tanks

Sources of Gas

Region-to-Region Pipeline Capacities

(Volumes in million cubic feet per day)



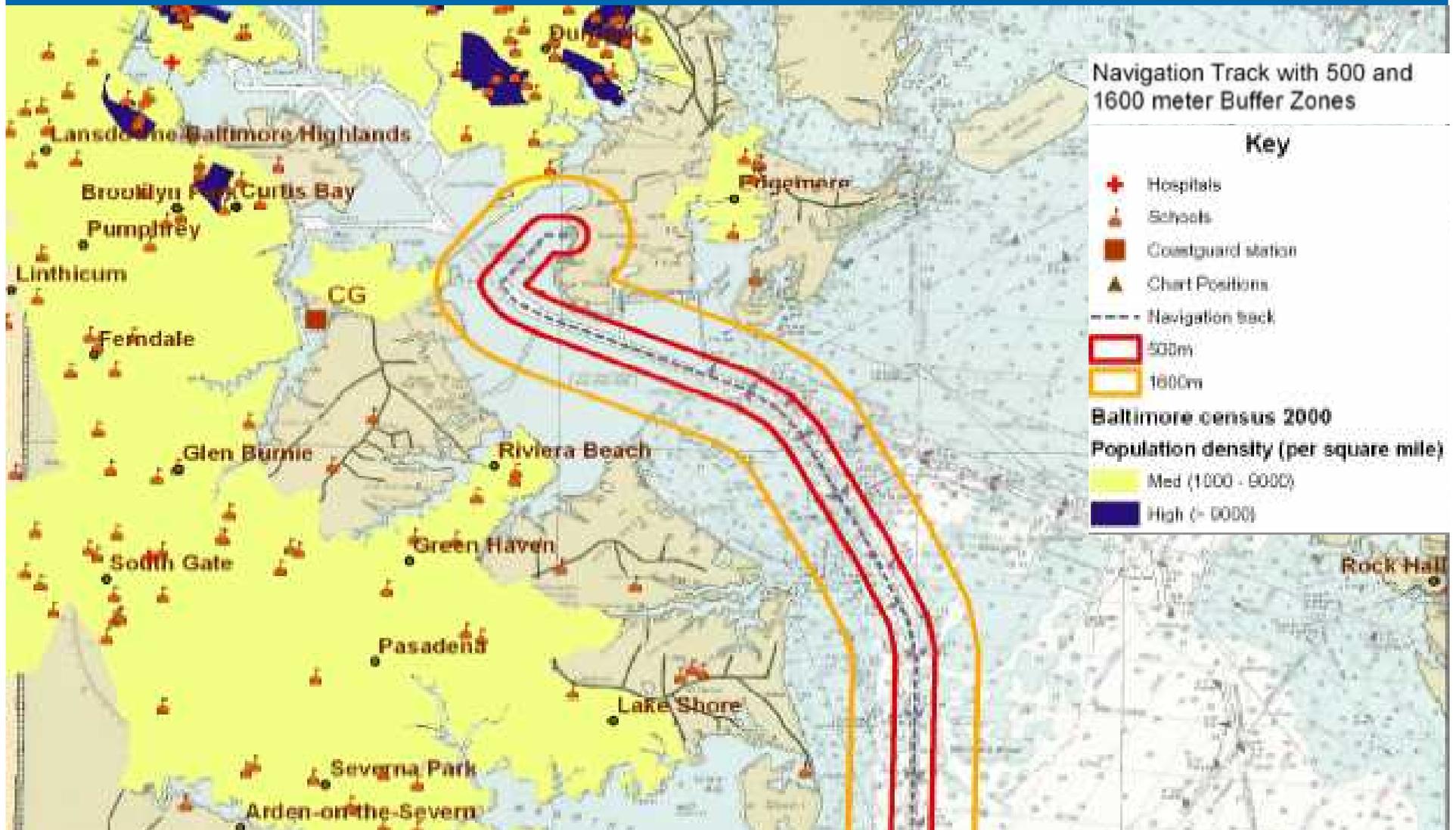
- Export capacity was not in place in 2000.

Source: Energy Information Administration, Gas Transportation Information System, Natural Gas Pipeline Capacity Database.

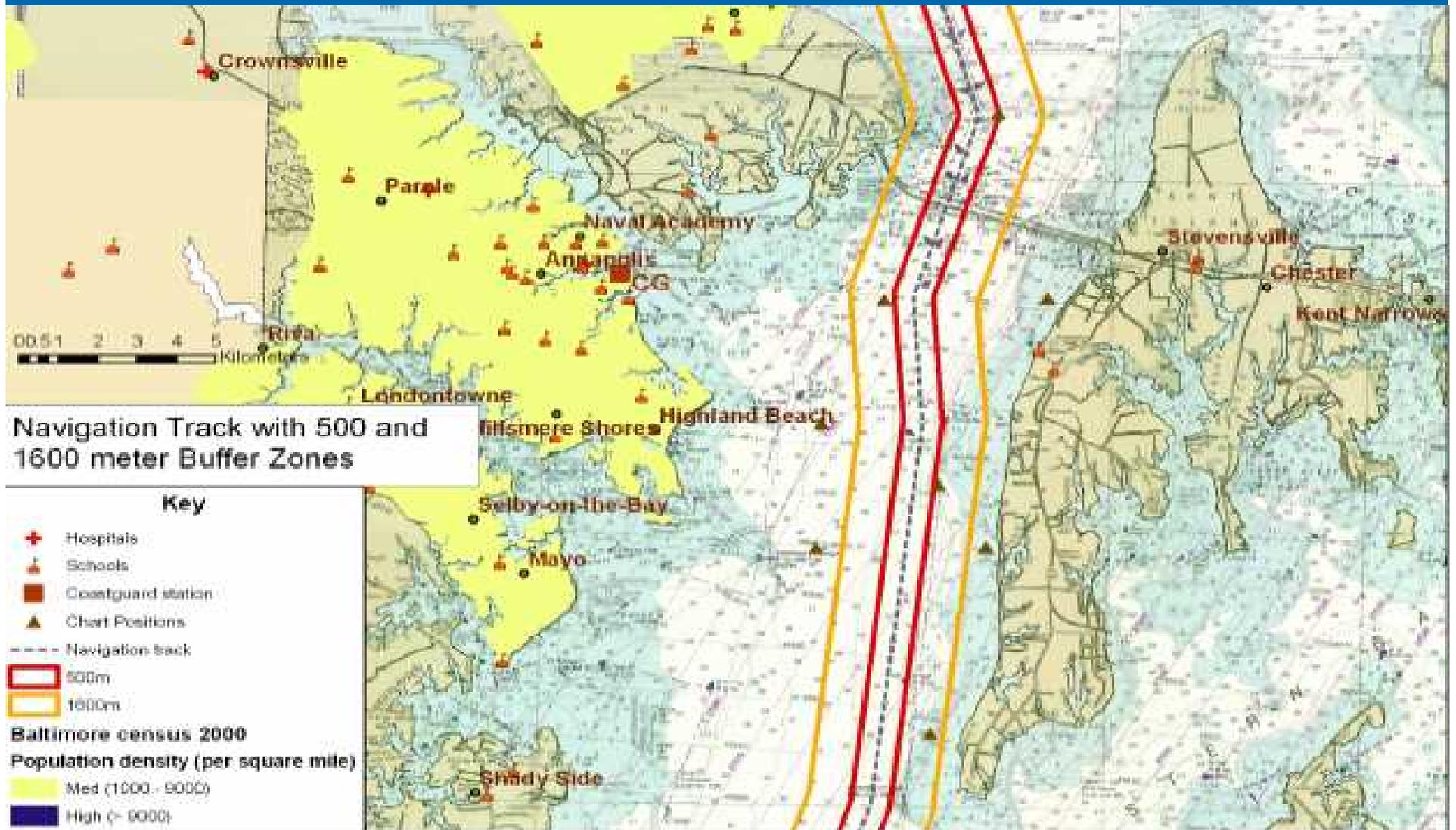
Project Location



Shipping Route



Shipping Route



Existing Site



Terminal Rendering



Terminal Rendering



Proposed Condition—One Vessel in Port

What is LNG?

- Liquefied natural gas is simply natural gas (primarily methane) cooled into a liquid by reducing temperature to 260°F below zero
 - Colorless
 - Odorless
 - Non-toxic
 - Very safe and inert at sub-freezing temperature
- 600 cubic meters gas = 1 cubic meter LNG
 - Allows for economical long-distance transport
 - Allows for economical storage
- About one-half weight of water
- Lighter than air at 160°F below zero
- Existing stateside LNG import projects in Massachusetts, Louisiana, Georgia, and Cove Point, Maryland

LNG Safety

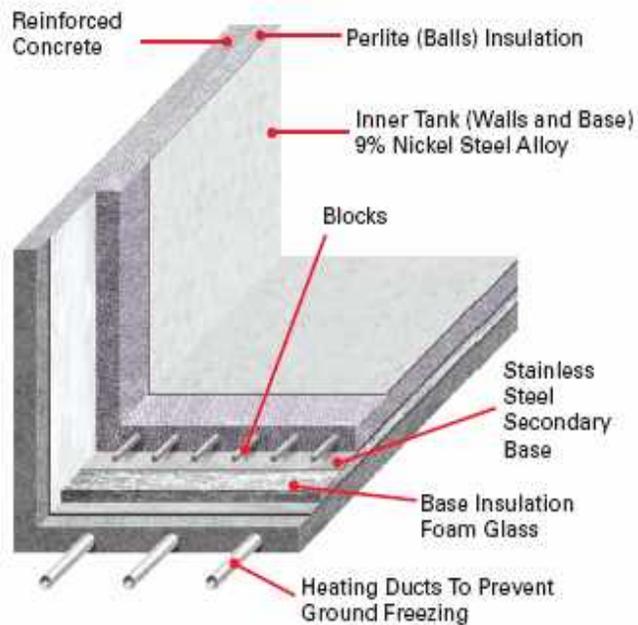
- LNG in its liquid state is NOT explosive or flammable; natural gas burns only in fuel-to-air ratio of 5 to 15%
- LNG is transported and stored in un-pressurized vessels
- Strict standards for materials, design, construction & operations
 - Cryogenic materials
 - Double containment (triple containment for Sparrows Point)
 - Set-back distances
- Project is reviewed by local, state, and federal agencies and experts such as local safety and fire officials, Federal Energy Regulatory Commission, U.S. Coast Guard, Maryland Department of Natural Resources, and many others

LNG Safety

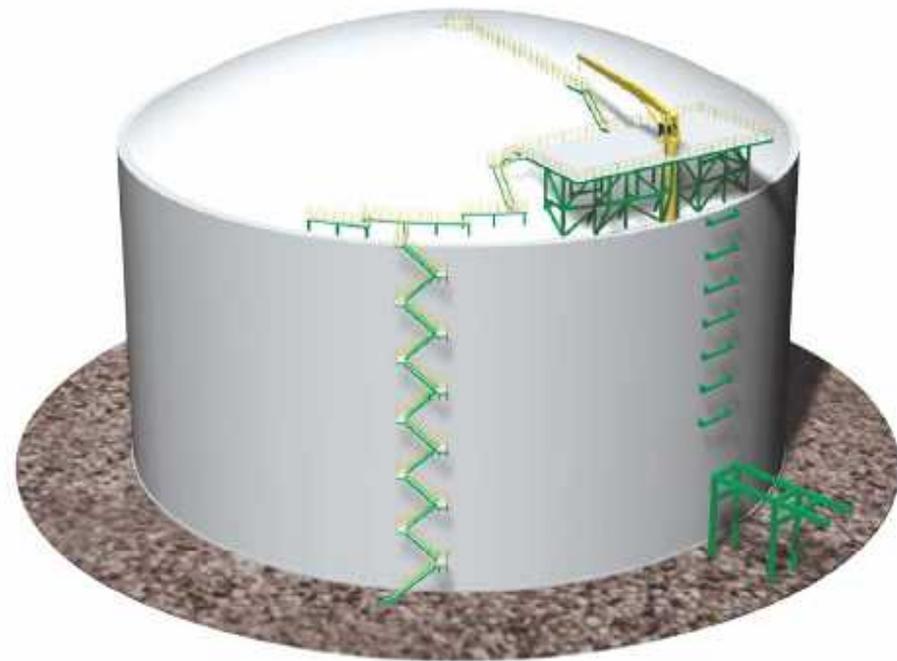
- According to National Firefighters Association web site
 - (For comparison), since 1940s more than 60 firefighter deaths from LPG fires, commonly seen on our highways in trucks
 - NO firefighter deaths from LNG fires
- LNG industry has an exceptional safety record

LNG Storage Tank

A Cross-Section of the Storage Tank Walls – In Total About Five and One-Half Feet Thick.



Typical Liquefied Natural Gas Storage Tank with Double Walls



LNG Ship Construction

The safety record of LNG ships far exceeds any other sector of the shipping industry with more than 40,000 deliveries. Over the past 40 years, there have been no collisions, fires, explosions or hull failures resulting in a loss of containment for LNG ships in port or at sea.



LNG ships are double-hulled and specially designed so that the LNG is stored in special containment systems that are not under pressure and at about -260 degrees Fahrenheit. With more than six feet between the outer hull and the cargo, these vessels are designed to protect the cargo tanks and prevent leakage or rupture in the rare event of an accident. The International Maritime Organization (IMO) has developed international standards for the construction and operation of all ships, including LNG carriers.

LNG SHIPPING OPERATIONS

All trends and ports worldwide that engage in international trade comply with the International Ship and Port Facility Security Code. Foreign flagged ships entering U.S. waterways meet the security requirements of the Maritime Transportation Security Act of 2002 (MTSA).

LNG ships entering U.S. waters are required by the U.S. Coast Guard (USCG) to have certified security plans that identify the persons authorized to implement security actions, describe provisions for establishing and maintaining physical security, cargo security, and personnel security, and address how they would respond to emergency situations.

Operators of LNG ships adhere to LNG ship management procedures and emergency plans developed by the regional Captain of the Port (USCG) marine safety unit. These procedures include requirements for pre-arrival notification, harbor transit, docking operations, cargo transfer, inspection, monitoring and emergency procedures.

Companies involved in LNG shipping work with the local Piracy Authority and the USCG to develop optimum plans for safe transit in and out of port. This coordination helps manage port shipping traffic, similar to air traffic controllers, with the aim of protecting against collisions while not adversely affecting movement of other traffic. The USCG can assign sea marshals to escort LNG ships as they transit in and out of U.S. ports to provide for harbor safety and security if warranted.



Inherent in the design of these LNG ships are numerous levels of safety systems, including Ship Traffic Management schemes with radar, global positioning equipment, global maritime distress systems, gas/hydrofire detector, and ship-to-shore communication systems. The cargo transfer system can not be operated if all cargo-related safety systems are not fully functioning. All the systems are designed to protect the integrity of the cargo and to ensure it is well-insulated and well-contained. Additionally, the ships are equipped with automatic identification systems that will allow ship tracking and monitoring while transiting on U.S. navigable waters.

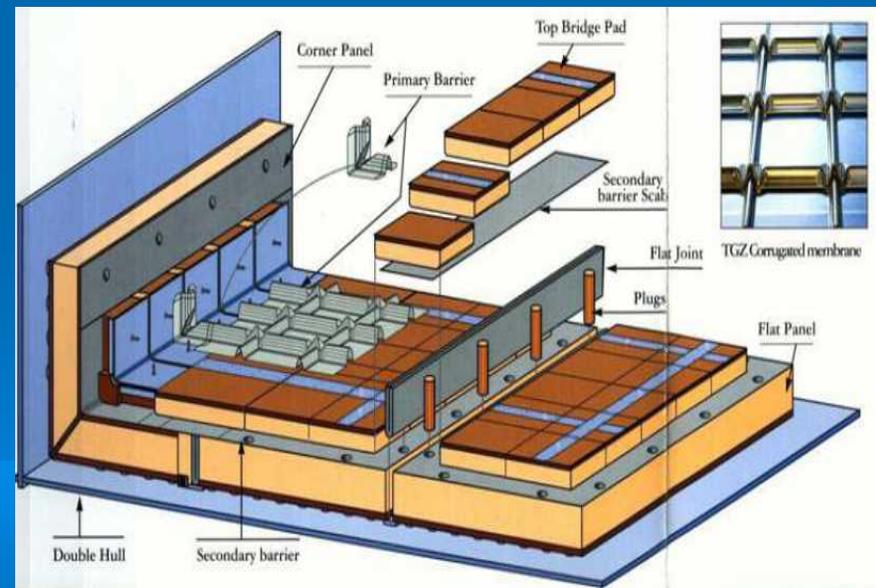
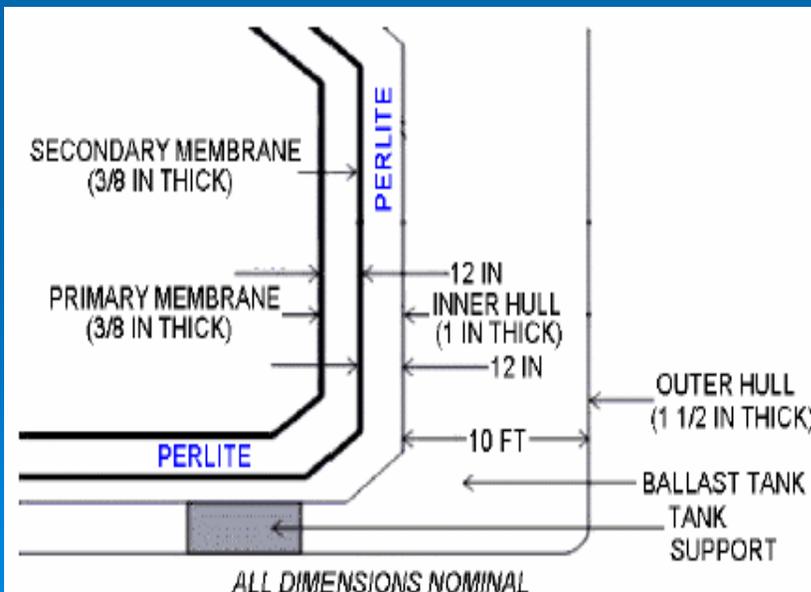


Crews of LNG ships are highly trained, specialized and experienced personnel. They are trained in detailed contingency plans to cover even the most unlikely of incidents. Regular exercises are conducted to test their response capability. International experts (including terrorist experts) test the robustness of plans, procedures, people and training. Before entering U.S. waters, the Immigration Service verifies crew identities. The ship provides crew identification 96 hours before arrival for personnel security clearance. Crews tend to be "dedicated" to a specific route and thus known to U.S. Bureau of Customs and Border Protection.

Ship Construction



Typical membrane ship construction with detailed cut-away of cargo containment system

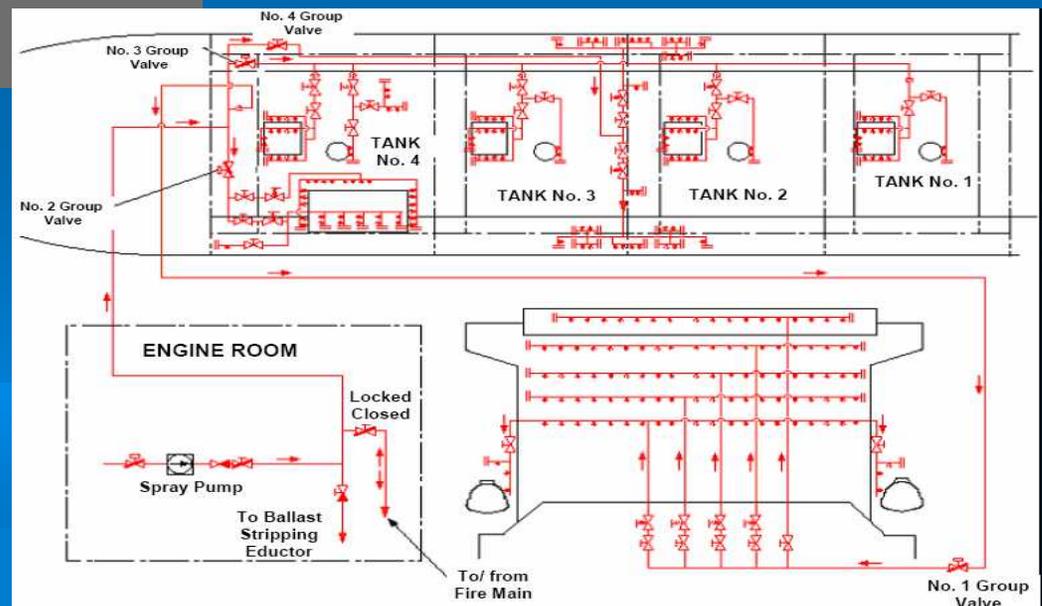


Water Spray System



Required on all LNG ships per IMO IGC Code and Classification Rules

Seawater is discharged to tank domes, manifolds, control valves, deckhouses, control rooms, and superstructure



El Paso Paul Kayser



Set-Back Zones

- Peer-reviewed studies have been performed to determine the lateral extent of thermal hazards of large-scale releases of LNG on water
- Calculated distances to the point where unobstructed exposure for 30 seconds may result in second degree burns (heat flux value = 5 kW/m^2)
 - Quest – 1,617 feet
 - Lehr – 1,650 feet
 - Fay – 3,630 feet per March 26, 2003 report
 - Vallejo (Koopman) – 4,257 feet
- Sandia National Laboratories evaluated these studies and concluded that none of them provided a characterization of how to manage risks to people and property of a large-scale spill over water
 - None identified the probability of the postulated events
 - None discussed the mechanisms or strategies that could be implemented to reduce the potential risk of such a spill
- LNG Opposition Team – 5,000 feet for site and 1,500 feet for vessel transit (Environmental Impact Assay for Sparrows Point: Volume III, Section 1, Document 2)

Site Aerial View



Floating Barrier



Environmental Considerations

➤ Dredging

- Extensive testing prior to decision on proper removal technique
- Estimated quantity – 3 to 4 million cubic yards
- Mitigation programs during and after construction
- Disposal management options being explored, including innovative re-use (recycling) opportunities

➤ Air Emissions

- Use of low-NO_x burners and selective catalytic reduction (SCR) in vaporization system that consists of boiler and glycol loop – no use of seawater or discharge of cold water
- Potential to reduce burner use by using heat from adjacent industries – win-win situation
- Air emissions from the facility will be below the requirements for new source review

➤ Rehabilitation of existing Brownfield site

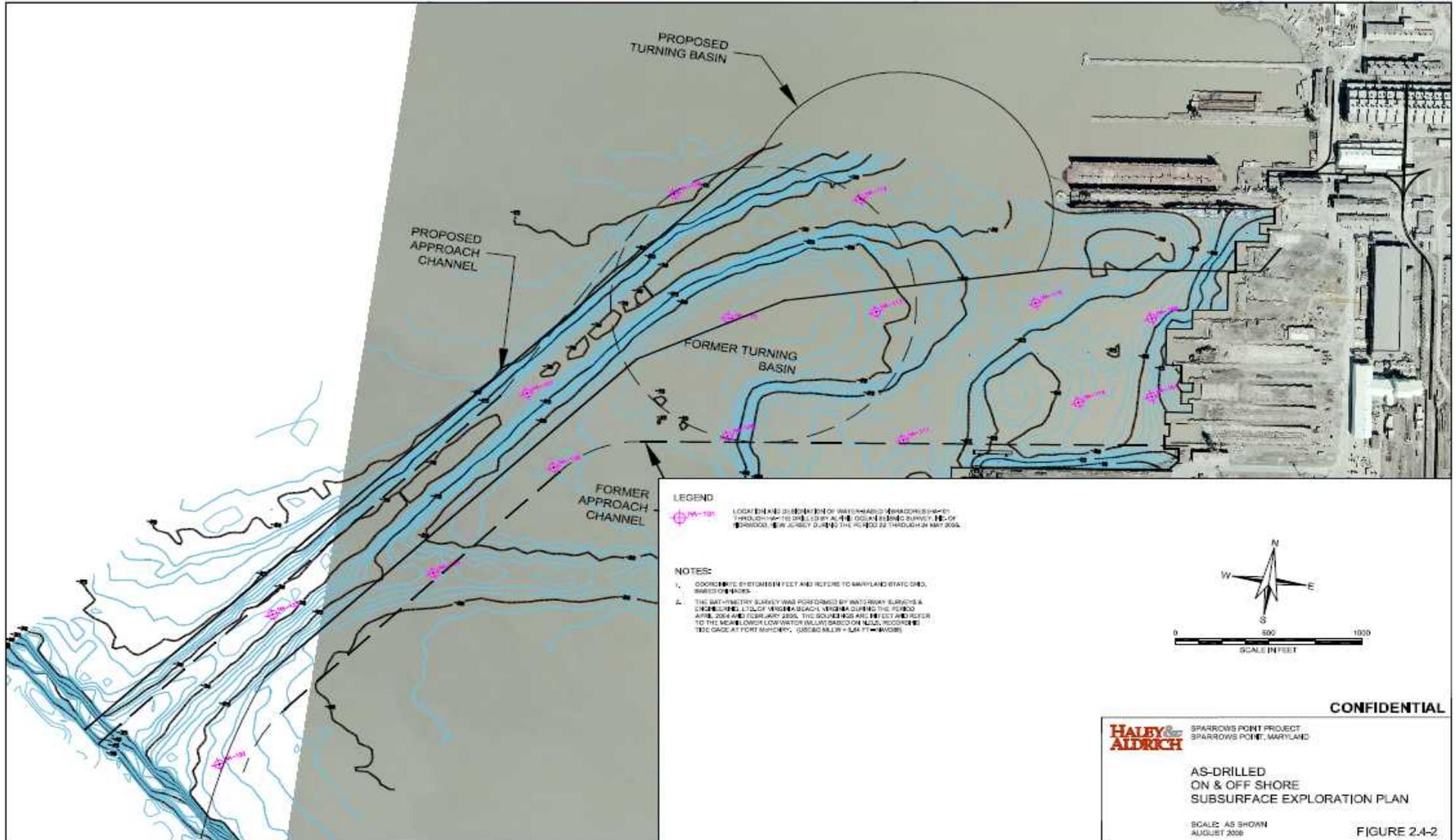
Dredging

➤ Dredging is a necessary part of the LNG Terminal as determined by:

- LNG tanker vessel design capacities and size
- Channel design guidance references
 - Current speed and direction, seabed type, wind speed and direction and other outside factors
 - Vessel design draft, ship squat and keel clearance, water density effects on ship, and other factors
- Final shipping simulations (MITAGS)



Dredge Sediment Boring Locations



Sediment Testing Summary

- Analyses performed for VOCs, SVOCs, metals, PCBs, pesticides, tributyl tin (TBT), hex-Cr, dioxin
- Results
 - Non-detect: pesticides, PCBs; trace: VOCs
 - 3 TBT detections, all low PPB range
 - Dioxins in low PPT range, consistent with atmospheric sources
 - Principal detections were polycyclic aromatic hydrocarbons (PAHs) and metals, PPB to PPM range, consistent with historic local data

Sediment Quality

- Trends of sediment data
 - Concentrations decrease - shallow (highest) to intermediate and deep (lowest) samples
 - Also apparent correlation between flow direction (SE), organic carbon content, and grain size
- Potential influence on dredge approach
 - Shallowest 15% (approximate) of material contains highest concentrations and will be removed
 - Deeper sediments sandier, lower to non-detect concentrations
 - Segregation approaches being considered for management

Dredge Techniques

- Mechanical dredging (clamshell) and limited backhoe dredging in inshore areas
- In preparation of processing, dredged material will be placed into sealed hopper scows (barges)
- No barge overflow of water or solids
- Initial sediment quality indicates similar to characteristics of other projects in Baltimore Harbor
- Dredges are readily adaptable to environmental dredging techniques with use of an environmental bucket and expanded positioning controls if necessary due to further sediment characterization or as required by permit conditions

Environmental Dredge Clamshell Bucket



Innovative Re-Use

- Abandoned mine land and quarry reclamation
- Brownfields redevelopment
- Landfill capping and closure
 - Alternate grading materials
 - Low permeability cap layer in lieu of geo-membrane systems
- Manufactured top soil
- General structural and non-structural fill for commercial / industrial development
- Bulk construction fill
 - Site grading material
 - Highway embankments
- All uses are commercially feasible

Processing Facility



Sparrows Point Recap

- LNG imports can save consumers up to 15 to 30% in direct cost over piped natural gas (WSJ) and more when added supply offsets increasing demand
- LNG safety record is outstanding
- Natural gas cleanest-burning fossil fuels; energy production using natural gas is consistent with Maryland's Healthy Air Act
- Recycle dredge materials in safe, clean way
- Sparrows Point considered remote site
- AES's history of community involvement
- Significant local and state taxes
- Union jobs and indirect benefits during construction
- High paying permanent jobs and indirect opportunities during operations
- NO government subsidies of any kind needed, entirely self-sustaining

Thank You

- On behalf of entire AES team
- Thanks for opportunity to show details of proposed LNG site's safety and benefits
- Visit AESsparrowpointLNG.com for more details
- Visit the FERC website

