BROADWATER

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August 15, 2007

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426
U.S.A.

Dear Secretary Bose:

Re: *Broadwater Energy LLC*, Docket No. CP06-54-000;
Broadwater Pipeline LLC, Docket Nos. CP06-55-000 & CP06-56-000

The Applicants, Broadwater Energy LLC and Broadwater Pipeline LLC (jointly "Broadwater") have engaged in discussions with the New York State Department of State ("NYSDOS"), a cooperating agency in the NEPA review process for the Broadwater LNG Project ("Project"), with respect to the NYSDOS' coastal zone consistency review process. Numerous technical data meetings and document exchanges have taken place between Broadwater and NYSDOS throughout the course of the application process. This submission is comprised of the additional information that has been provided to NYSDOS during this engagement period. In addition, Broadwater seeks by this submission to clarify certain matters raised by the NYSDOS in its July 3, 2007 letter filed with the Commission. As with other Broadwater responses to Environmental Information Requests from the FERC and other cooperating agencies, this information is submitted to the FERC for inclusion in the consolidated record for the Project and associated proceedings.

A. Supplemental Information

Beginning April, 2007, Broadwater and NYSDOS entered into a series of meetings and information exchanges to address additional coastal zone consistency issues raised by NYSDOS. Five technical data meetings occurred on the following dates:

- April 12, 2007
- May 2, 2007
- May 23, 2007
- June 13, 2007
- July 24, 2007

The main topics for discussion at each of these meetings included:

- Atlantic alternatives to Project siting and fatal flaws with these locations;
- Mitigation and offsets;
- Emergency Response Plan;
- Inability to retrofit LNG carriers to be SRVs;
- LNG carrier fleet sizes;
- Regional market demand projections;
- Impact of new supply on the market;
- Proximity to industrial facilities;
- Visual comparison of vessels currently transiting Long Island Sound and the FSRU;
- Safety and security considerations for the facility;
- Vessel transit times; and
- Impact minimization implemented by Broadwater as part of the project design process.

As part of the follow-up that took place after each of these meetings, Broadwater provided additional documents and analysis to the NYSDOS including: (1) a vessel silhouette comparison; (2) details of the benefits of a v-notch program that could be part of the social investment program; (3) contract quantities for Iroquois meter stations on Long Island and in NYC, and (4) a detailed impact analysis of potential Atlantic alternatives (provided in June 20, 2007 filing to FERC). These additional items provided to NYSDOS as well as the PowerPoint presentations that Broadwater presented at each technical meeting are attached hereto as Appendices 1 to 3.

B. Response to NYSDOS July 3 Letter

Details on the Atlantic alternatives analyzed by Broadwater as part of its discussions with NYSDOS were filed on June 20, 2007. In turn, NYSDOS provided a response to FERC on July 3, 2007 regarding this filing. Broadwater is providing this information to clarify additional questions raised by NYSDOS in the July 3, 2007 letter.

1. **Transco Long Beach Pipeline** – In its July 3, 2007 letter, NYSDOS indicates that it has not received information demonstrating that Iroquois Gas Transmission System pipeline ("Iroquois") is the preferred alternative in the region or that other pipeline systems cannot accommodate or be expanded to accommodate the proposed volume of gas. Broadwater notes that the issue of Iroquois as the preferred pipeline system to

serve the region is discussed at length in FERC Resource Report 10 (Alternatives), pages 10-12 to 10-18, which includes an evaluation and rejection of Transco as a system alternative.

Also, at the second technical data meeting with NYSDOS on May 2, 2007, the concept of connecting a send-out pipeline from an Atlantic LNG terminal location with Transco's Long Beach Pipeline (i.e. Lower New York Bay Extension), was raised by the NYSDOS staff as a variation on the Transco system alternative discussed in Resource Report 10 and addressed by Broadwater.

Broadwater explained that:

- The Williams' Transco pipeline system extends from South Texas and Western Pennsylvania to New York City. It transports gas from the Gulf Coast to 12 Southeast and Atlantic Seaboard states, including major metropolitan areas in New York, New Jersey and Pennsylvania. Transco's pipeline system crosses the Hudson River at various locations to access the Manhattan and Long Island markets at four existing sales meter stations:
    - # 6051 Manhattan (ConEd)
    - # 6115 Central Manhattan (ConEd)
    - # 6062 Narrows (KeySpan)
    - # 6210 Long Beach (KeySpan)

- Transco is undertaking modifications to its system in New Jersey and Long Island to improve service to its Long Beach Meter Station # 6210 in Nassau County by increasing the throughput of its 26-inch subsea Lower New York Bay Extension from 600 MMcfd to 700 MMcfd, partly by uprating the pipeline from a Maximum Allowable Operating Pressure (MAOP) of 800 psig to 960 psig (*see* Leidy to Long Island expansion project, FERC Docket No. CP06-34-001).

- Iroquois is a 411-mile interstate natural gas pipeline from Waddington, New York through western Connecticut to Long Island, and from Huntington to the Bronx. Its location in the Northeast enables shippers to reach numerous local distribution companies throughout New England, New York and New Jersey (via exchanges), and numerous electric generators in ISO New England and ISO New York. In the market region Iroquois is a 24-inch system. What sets it apart from other transmission pipelines in the region, including Transco, is its Maximum Allowable Operating Pressure (MAOP) of 1,440 psig.

- Broadwater's target market region is New York City, Long Island and Connecticut. Broadwater proposes to make a subsea interconnection with Iroquois on its pipeline crossing between Connecticut and Long Island. Broadwater's anticipated distribution of gas deliveries to the region at the terminal's nominal send-out of 1 Bcf/d are 250 to 500 MMcfd to Connecticut and 500 to 750 MMcfd

to Long Island and New York City (not including existing deliveries to the region on the Iroquois pipeline system).

- Due to operating pressure restrictions in both the Transco Lower New York Bay Extension (960 psig) and KeySpan's trunkline system on Long Island commencing at Long Beach (maximum 350 psig), up to approximately 700 MMcfd of Broadwater's 1 Bcf/d nominal send-out would not be able to reach the intended New York City, Long Island and Connecticut markets but would be displaced (i.e. gas flow would be backed up) onto the Transco system depending on market pull at Long Beach. These displacement volumes from Broadwater would need to be consumed in New Jersey, or points farther west or south that currently access Gulf Coast gas supply (including existing and new LNG import terminals), or would need to be sent to storage.

  Accessing Broadwater's target market region east of the Hudson River would be hindered by existing river crossing capacity (only small scale, incremental capacity expansions of Transco's crossings of the Hudson are possible, such as the Leidy to Long Island 100 MMcfd expansion), and the inability of LDCs to move large volumes over long distances, compared to the throughput capacity and deliverability of the 1,440 psig Iroquois system. Eastern Long Island and Connecticut, in particular, could not be served from an offshore Atlantic LNG terminal connected to Transco. Connecting directly to Iroquois from a LNG terminal in Long Island Sound avoids these drawbacks.

  In conclusion, a direct connect to Iroquois will serve New York City, eastern Long Island and Connecticut given that Gulf Coast pipelines serving New York City and Long Island are confronted with significant impediments to expansion due to urban encroachment and environmental concerns. The high pressure Iroquois system is positioned to best serve eastern Long Island and Connecticut as well as New York City customers through existing and proposed high pressure pipelines and purpose built, high capacity gate stations that can be expanded to match demand.

2. **Technical Feasibility of an Atlantic Mooring Tower** – Broadwater discussed some of the issues associated with the technical feasibility of an Atlantic mooring tower with the NYSDOS at the May 2, 2007 meeting (a copy of the presentation is provided in Appendix 1 to this submission.) The design of the Yoke Mooring System within Long Island Sound is designed to withstand extreme wave events within Long Island Sound (wave heights up to 7.0 meters) as well as a Category 5 hurricane. Taken together, the overall design of the Yoke Mooring System is designed to withstand a storm event with a likelihood of less than 1 in 1,000 years. By comparison, typical design values in the Gulf of Mexico for storm events consider a likelihood of 1 in 100 years. In the case of Long Island Sound, Broadwater's assessment of a 1:100 year significant wave height is 4.3 meters. More general aspects of the Yoke Mooring System design, from a safety perspective, are discussed in Resource Report 10, pages 11-22 to 11-26.

In its June 20, 2007 submission to FERC, Broadwater discussed the prevailing metocean conditions associated with alternate locations in the Atlantic. It was noted that within the last 15 years a wave event of 9.3 meters was recorded at the nearest NOAA metocean buoy (#44025). While Broadwater has not completed a detailed metocean study for the Atlantic locations suggested by NYSDOS, there is a very high likelihood that a statistical review of the data would indicate that significant wave heights in excess of 10 meters or more would be associated with a 1:100 year storm event. If a more conservative design criteria were chosen, such as that adopted for the design of the Yoke Mooring System in Long Island Sound, the extreme wave event for design purposes would be correspondingly greater.

In addition to wave height, maximum wind and ocean currents must be considered, which could also dictate more stringent design requirements. Broadwater reviewed these potential design requirements and their implications for the design of the Yoke Mooring System. These issues have not been evaluated in detail to determine their technical viability. Some of the more significant implications are:

(a) Designing for increased wave height would require a larger air gap for the lower deck of the mooring tower, which would require the overall tower height to increase.

(b) The YMS design requires that the ballast tank, which provides the force that holds the FSRU at a constant distance from the mooring tower, must always be unsupported by the sea. To accomplish this, a larger and taller Mooring Support Structure must be designed and mounted on the bow of the FSRU.

(c) Because of the greater forces associated with significantly greater wave heights, the ballast tank itself must be enlarged to provide a larger restoring force, which would increase the amount of steel required in the Mooring Support Structure mounted on the bow of the FSRU.

(d) The increased requirements for the Mooring Support Structure would, in turn require additional reinforcement of the bow of the FSRU to support the increased weight.

(e) The YMS design must be capable of resisting overturning forces that would occur if a significant wave were to strike the facility broadside. The mooring system, and particularly the mooring tower, would require additional strengthening to resist these forces. This would imply a large footprint for the tower, as well as larger, deeper and more numerous piles to affix the tower to the sea bed. No geotechnical investigation has been completed to determine whether seabed conditions could be capable of sustaining these requirements, or the related environmental impacts of a larger footprint.

In summary, the significantly harsher metocean conditions in the Atlantic Ocean would have major technical and economic consequences for the design of the Yoke Mooring System.

3. **Footprint of FSRU versus an SRV -** In its July 3, 2007 letter, NYSDOS discusses the issue of the footprint of an offshore Shuttle Regasification Vessel (SRV) port compared to that of the Broadwater FSRU. NYSDOS is critical of the estimates provided by Broadwater, suggesting that if the impact of exclusion zones is included, Broadwater's estimate for the footprint of the FSRU may be low, and the estimate of the footprint associated with the SRV may be high. Broadwater respectfully disagrees with the NYSDOS staff as this is not a matter of simply comparing the safety and security zones for an FSRU versus an SRV; other considerations, such as marine safety, also must be factored into a comparison of surface areas impacted.

   As part of its evaluation of technical alternatives, Broadwater compared features of the FSRU and the SRV options. In Resource Report 10 of Broadwater's FERC application Table 10-8, page 10-28 is presented contrasting various aspects of each technology. One of the features evaluated is described as the "Terminal Surface Use Area" and the table compares the amount of surface area affected by each technology. For the FSRU, Broadwater concluded that the surface area impacted was contained in one full turn of the FSRU, since the facility is able to weathervane with the prevailing wind and waves. This is the basis for the estimate of 548,000 m^2.

   With respect to the SRV alternative, in order to provide sustained deliveries of the FSRU equivalent of 1 bcf/d, three SRVs would need to be operating at all times. Thus, Broadwater assumed a delivery facility comprised of three unloading buoys arranged symmetrically around a central platform. These buoys were spaced approximately two miles apart, to ensure safe operability during unloading operations. This is somewhat greater than the buoy spacing currently proposed for the Northeast Gateway project, which has two buoys separated by approximately 1 nautical mile (1850 meters).[1] Greater buoy spacing was assumed with the addition of a third unloading buoy due to increased ship traffic. Also, surface impacts can potentially extend beyond the area of the safety and security zone. For the Northeast Gateway project, a mandatory No Anchoring Area is proposed to further facilitate port operations and safety. This area encompasses a 1,100 yard radius from the center point of each buoy. This area is considered necessary to prevent vessels from anchoring within the facility's mooring system, as the mooring lines will extend beyond the area of the safety zone.[2]

   Further, in the absence of a dedicated storage facility (such as the FSRU possesses), SRVs will be arriving and departing on a very frequent basis, perhaps two to three times as many visits per week as the 2-3 LNG carrier deliveries per week to the FSRU. The constant arrival and departure of SRVs from the area of the delivery facility, will impose significant constraints on other marine uses in the area of operations.

[1] Northeast Gateway Final Environmental Impact Statement, October 2006, pp. 2-4.
[2] *Id.* at pp. 2-9.

No consideration was given to the area subsumed by the safety and security zone around the LNG facility in either instance. The comments to Table 10-8 clearly state "*No allowance made for safety zones or maneuvering areas in areal estimates.*"

Considering the NYSDOS question about the safety and security zone, the Coast Guard, in its Waterway Suitability Report (WSR) of September, 2006, proposed a safety and security zone centered on the mooring tower with a radius of 1210 yards. The area inside the zone encompasses about 1.5 square miles or 3.8 million m^2. The area covered by the proposed safety and security zone amounts to 0.12% of the total area of Long Island Sound. If the additional area of the safety and security zone beyond the "sweep" of the FSRU around the YMS is added to the 548,000 m^2 calculation referenced above, the impacted surface area of the FSRU is still less than that associated with the three buoy SRV configuration required for a comparison to Broadwater.

NYSDOS also indicates that consideration should be given to the periodic "footprint" associated with LNG carrier transits, given the proposal in the Coast Guard's WSR for a safety and security zone around the LNG carriers of 2 nautical miles ahead, 1 nautical mile behind and 750 yards on either side of the vessel. The total area contained within this ellipse is approximately 6 million m^2. It should be recognized, however, that this "footprint" has a short duration, given the rate at which LNG carriers will traverse the approximately 50 nautical miles from entering Long Island Sound to the proposed FSRU location. As noted by the Coast Guard, at a typical speed of 12 knots, it would take approximately 15 minutes for the entire zone to pass a given point. Broadwater has assessed the amount of time that the safety and security zone would affect any given point along the LNG carrier route and determined that any given point along the route would be impacted between 1.0% and 1.5% of the time on an annual basis, depending on the frequency of LNG carrier arrivals. Further, this does not account for deliveries in the winter months, or deliveries occurring at night, which would further reduce potential impacts and time estimates. Based upon the size and frequency, Broadwater submits that consideration of the "footprint" of the LNG carriers within Long Island Sound is temporary in nature and therefore should not be considered permanent in the sense suggested by NYSDOS.

4. **Nearshore Pipeline Effects** – Broadwater provided NYSDOS and FERC with a number of evaluations of the potential impacts that pipeline construction can have in nearshore environments in its FERC Application (Resource Report 10) and Environmental Information Request responses, as well as in the Atlantic Alternatives Analysis submittal provided on June 20, 2007. Broadwater fully expects that FERC and its third party contractor will engage with other cooperating agencies in the EIS process for review and comment on the information that has been supplied by Broadwater and make certain that potential impacts from the preferred alternative as well as suggested locations in the Atlantic have been fully and accurately characterized.

Sincerely yours

/s/ Murray A. Sondergard

Murray A. Sondergard
Project Director

Enclosures

Appendices

Appendix 1 – Broadwater Presentations to NYSDOS
April 12, 2007 – First Technical Meeting
May 2, 2007 – Second Technical Meeting
May 23, 2007 – Third Technical Meeting
June 13, 2007 – Fourth Technical Meeting
July 24, 2007 – Fifth Technical Meeting

Appendix 2 – Information Response Provided on June 22, 2007

Appendix 3 – Information Response Provided on June 29, 2007

Appendix 1
Broadwater Presentations to NYSDOS

April 12, 2007 – First Technical Meeting

May 2, 2007 – Second Technical Meeting

May 23, 2007 – Third Technical Meeting

June 13, 2007 – Fourth Technical Meeting

July 24, 2007 – Fifth Technical Meeting

Broadwater Energy

Assessment of Alternatives
Relative to Long Island Sound

Meeting with New York Department of State
Coastal Resources Division

April 12, 2007
Albany, New York

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Meeting Agenda

Topic	Time Req'd
1.0 Introductions	9:00 – 9:15
2.0 Broadwater Assessment of Alternatives 2.1 Site and Concept Selection Process 2.2 Offshore Regasification – Technical Concepts 2.3 Atlantic Ocean Conditions 2.4 Pipeline Considerations	9:15 – 11:00
3.0 Questions and Follow-Up Issues	11:00 – 11:30
Break	11:30 – 12:45
4.0 NYSDOS Data	12:45 – 1:00
5.0 Next Steps/Action Plan	1:00 – 1:30

Assessment of Atlantic Alternatives

- Updated information and additional data provided in response to Info Request (Item J)
  - Summary of alternatives reviewed
  - Summary of data sources consulted on Atlantic sites
  - Incorporated into presentation

Site & Concept Selection Process

Purpose and Need

To provide a source of reliable, long-term, and competitively priced natural gas to the Region to meet growing demand. To fulfill this a viable LNG import terminal concept and site must meet, at a minimum, the following specific criteria:

- **Be technically and economically feasible, practicable, and implementable;**
- **Maximize the buffer between the Project and populated areas;**
- **Have significant environmental benefits over other alternatives;**
- **Be able to provide reliable natural gas deliveries to the Region via pipeline connections;**
- **Provide deepwater berthing to accommodate up to 250,000 m^3-capacity LNG carriers;**
- **Provide for storage and vaporization facilities for at least 1.0 bcf/d of natural gas for an in-service date of 2010;**
- **Comprise a site that allows the terminal to maintain sufficient control and proprietary rights of operation;**
- **Comprise a site situated close to an existing pipeline system serving the Region with downstream takeaway capability greater than 1.0 bcf/d; and**
- **Be able to ensure facility and interconnecting pipeline operability for a minimum 30-year project life.**

The Region Defined

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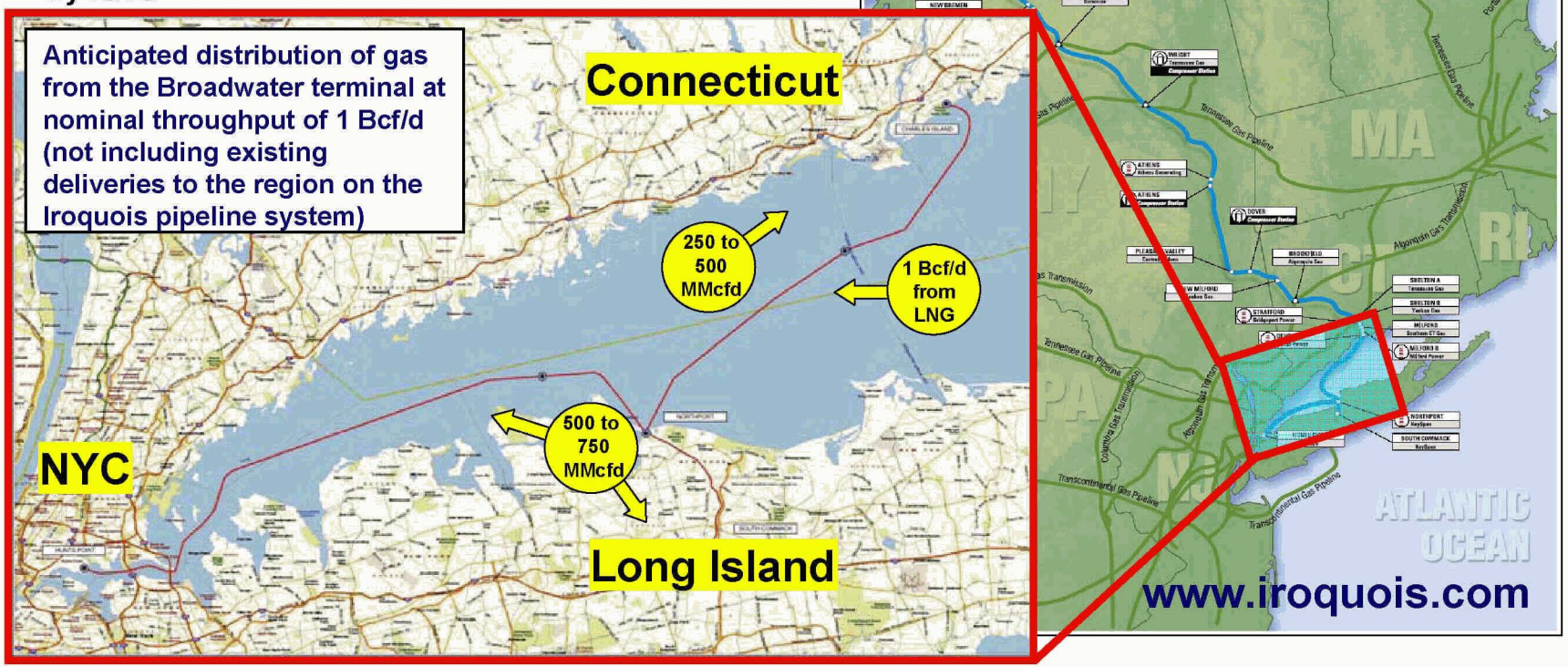
Regional Market Access via Iroquois

- Most recent major regional pipeline addition (1992), with Eastchester expansion in 2004
- High pressure, high efficiency operations (1440 psi MAOP)
- Broadwater's analysis indicates capability to transport significant additional volumes; supported by IGTS



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LNG Terminal Alternatives Considered

Onshore Terminal bordering Long Island Sound		• Co-locate at existing port facility and/or shoreline industrial area. • Significant and permanent impacts on nearshore and shoreline environments (earthwork, dredging and/or jetty construction). • Proximity to heavily populated areas - safety and disruption issues. • Overland pipeline and/or shore crossing construction to connect to pipeline grid.
Offshore Gravity Based Structure (GBS)		• Large concrete structure with integrated storage tanks resting on seafloor, with associated long term impact. • Maximum 60' of water to minimize cost. Only viable locations closest to shoreline – impacts to nearshore environment. • Closer to populated areas with greater visual quality impacts compared to locations mid-Long Island Sound.
Offshore Shuttle Regasification Vessel (SRV)		• Specialized LNG vessels that contain regasification equipment. • Connects to specialized offloading buoy in minimum 130' of water. • Offloads natural gas (i.e. regasified LNG) and injects it into a subsea natural gas pipeline at standard pipeline pressures. • Reliability issues - continuous off-loading from LNG vessel(s) essential; 3 buoys required for sustained operation.
Offshore Floating Storage and Regasification Unit (FSRU)		• Based on LNG carrier technology and features of floating production storage and offtake (FPSO) units but with LNG storage, regasification, and natural gas send-out capabilities. • Moored in place using a yoke mooring system (YMS). Includes a stationary tower structure secured to the seafloor by multiple legs. • FSRU allowed to pivot around the mooring tower base.

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Regional Screening

Regional Screening Process

- Broadwater has determined there are no no-action, postponed action or system alternatives (transmission pipeline or other LNG terminal) that meet the purpose and need of the Project.
- Between the falls of 2002 and 2004 Broadwater engaged in a comprehensive, phased analysis of various LNG sites and facility concepts. Alternative concepts and sites evaluated covered Long Island Sound, Block Island Sound, and the Atlantic Ocean.
- The general methodology for this site selection process involved:
  - Identifying a potential geographical area in which an LNG facility could be sited to best serve the Region;
  - Identifying a feasible siting area, given the broad application of technical and environmental siting criteria; and
  - A step-by-step narrowing of the potential geographical area down to a proposed site judged to be most appropriate with respect to potential environmental impacts.

Facility Concepts and Site Locations

Broadwater identified 24 individual alternative facility concepts and site locations for analysis. The 24 sites and concepts provided a range of options in terms of both offshore and onshore areas of the Region:

- **9 GBS Sites: Potentially technically feasible GBS sites could only be identified in the Long Island and Block Island Sound. GBS sites on the Atlantic Coast were not considered feasible because of the quick bathymetric drop-off of the sea floor, which would result in the GBS being located close to the coastline.**
- **5 FSRU Sites: Potentially technically feasible FSRU sites could be identified only in the Sound and Block Island Sound (tower-moored) as well as the Atlantic Ocean close to Long Island (turret-moored).**
- **8 Land-based Sites: Eight potentially feasible onshore locations were identified on both the Connecticut and New York shorelines as well as on Block Island. Primary areas considered were locations either within or adjacent to existing commercial activities and were primarily associated with existing ports due to the need for access for the deep-draught LNG carriers.**
- **2 SRV Sites: Two potentially feasible SRV sites were identified within the Atlantic Basin, close to Long Island.**

Facility Concepts and Site Locations

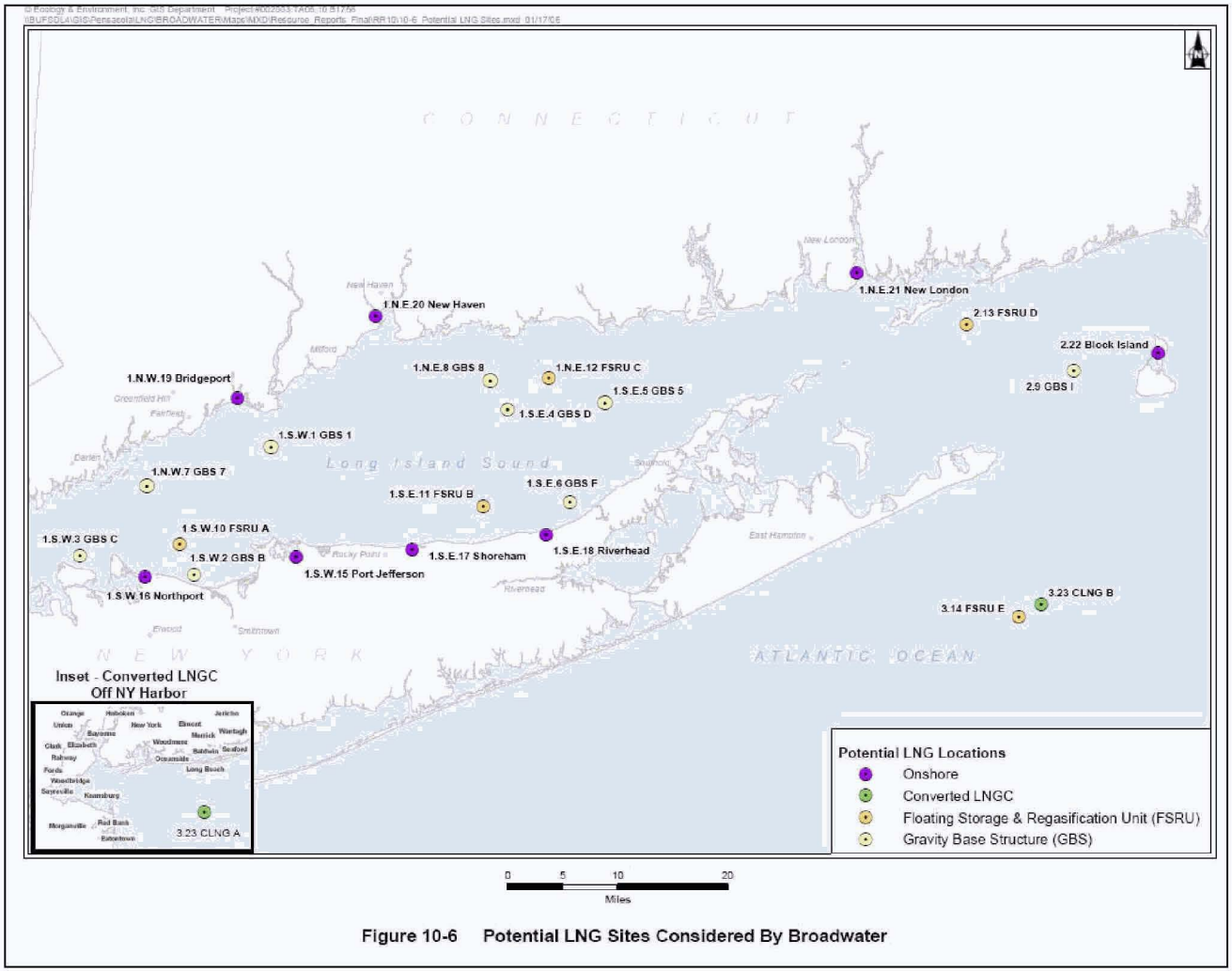

Figure 10-6 Potential LNG Sites Considered By Broadwater

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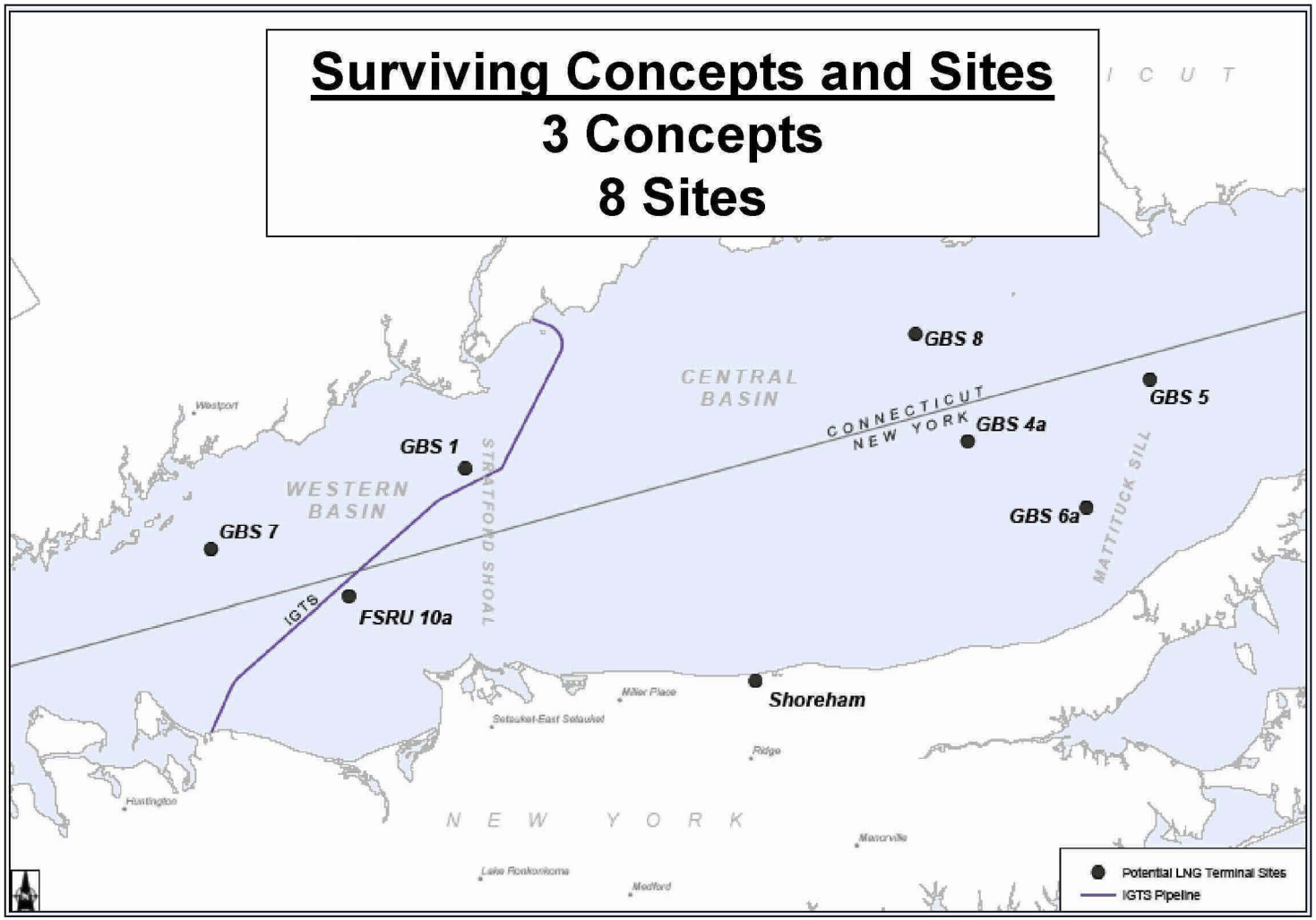
Regional Screening – First Pass

Broadwater eliminated 16 of the 24 site concept options. The 16 excluded sites had significant constraints, including:

- **Unsuitable met-ocean (weather and marine related) conditions;**
- **Proximity to densely populated areas;**
- **Pipeline routing, constructability, and operability issues due to length and seafloor environment;**
- **Impact on other users of the Sound;**
- **Proximity and impact on sensitive environmental/coastal resources; and**
- **Potential significant dredging requirements.**

LNG Concepts and Sites Further Evaluated



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Defining the Preferred LNG Terminal Alternative

Onshore Terminal bordering Long Island Sound		The remaining onshore terminal option at Shoreham was eliminated due to proximity to a densely populated area, the nearshore environmental impacts from construction of a jetty, and the likely need for dredging.
Offshore Gravity Based Structure (GBS)		The GBS option carries significant environmental challenges with respect to impacts on the seafloor and/or proximity to populated areas and was eliminated.
Offshore Floating Storage and Regasification Unit (FSRU)		Overall, the FSRU option is the most viable and environmentally sound technology alternative for the Region.

Preferred Offshore Technology Option

Offshore Floating Storage and Regasification Unit (FSRU)		vs.	Offshore Gravity Based Structure (GBS)	

Summary of factors favoring FSRU over GBS

- Less impact on the seafloor than GBS technology (artificial island construction would have even greater impact)
- Less visual impact than a GBS facility;
- Improved ability to berth LNG carriers due to the ability of the FSRU to orient in response to the prevailing wind, wave and current conditions;
- Ability to be sited far enough offshore (in waters deeper than 60 ft. – the limit for economically viable GBS options) to avoid populated areas and limit nearshore impacts; and
- Increased flexibility in siting because an FSRU facility can be sited in a variety of water depths.

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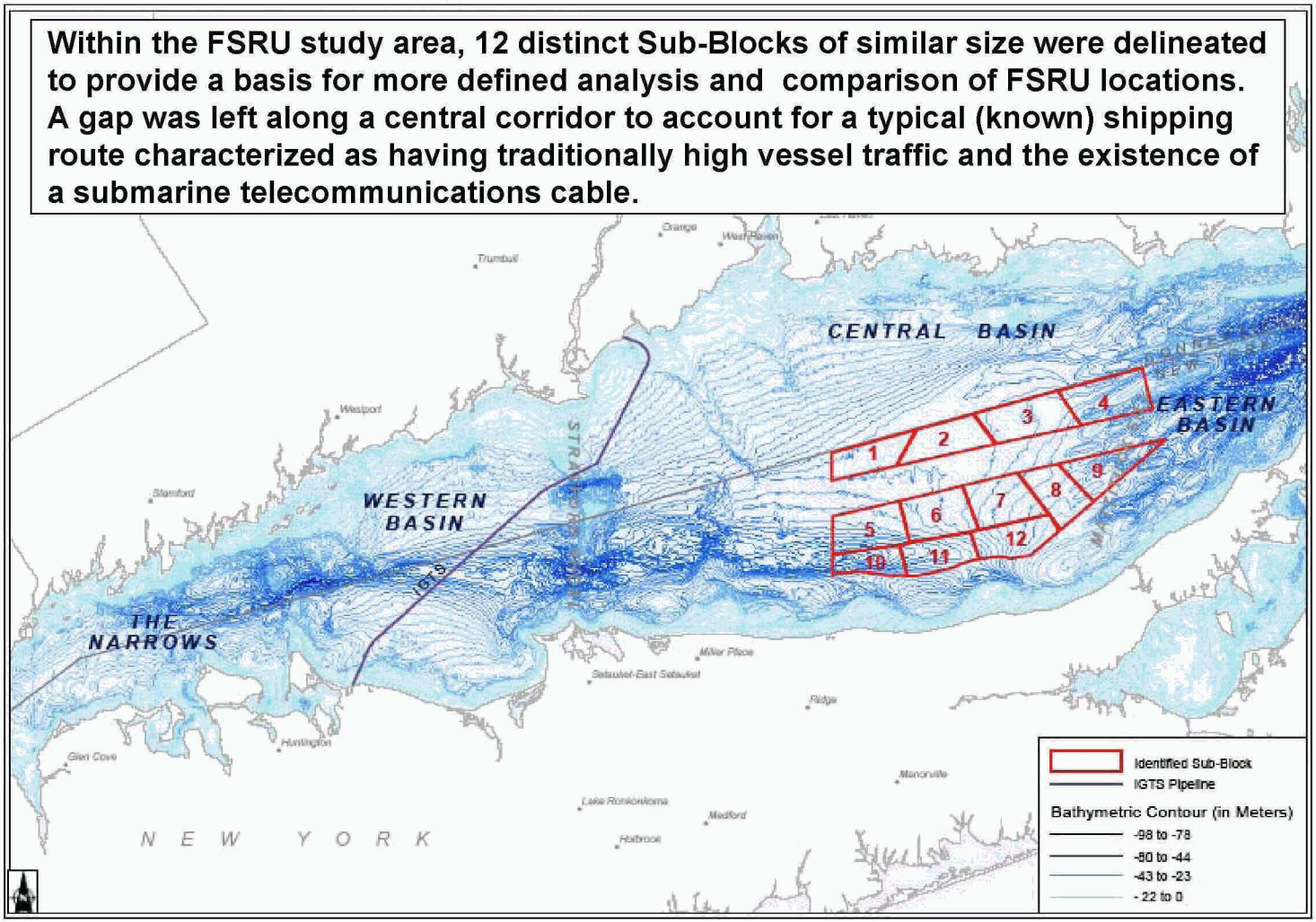
FSRU Siting Preferences

- From an engineering standpoint the preferred location for an FSRU is in the immediate vicinity of the IGTS pipeline. By siting in the immediate vicinity of the IGTS pipeline, the length of a connecting pipeline is limited, thereby providing operational efficiencies such as avoidance of gas transmission pressure and temperature losses inherent in longer pipelines.

- From an environmental/coastal resources standpoint, such a location is not optimal due to the decreased width of the Sound in this location, potentially increasing impacts on recreational and commercial boating traffic and being closer and having a greater overall impact on Long Island and Connecticut populations.

Sub-Blocks Within Final FSRU Study Area

Within the FSRU study area, 12 distinct Sub-Blocks of similar size were delineated to provide a basis for more defined analysis and comparison of FSRU locations. A gap was left along a central corridor to account for a typical (known) shipping route characterized as having traditionally high vessel traffic and the existence of a submarine telecommunications cable.



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Pipeline Alternatives – Basic Siting Requirements

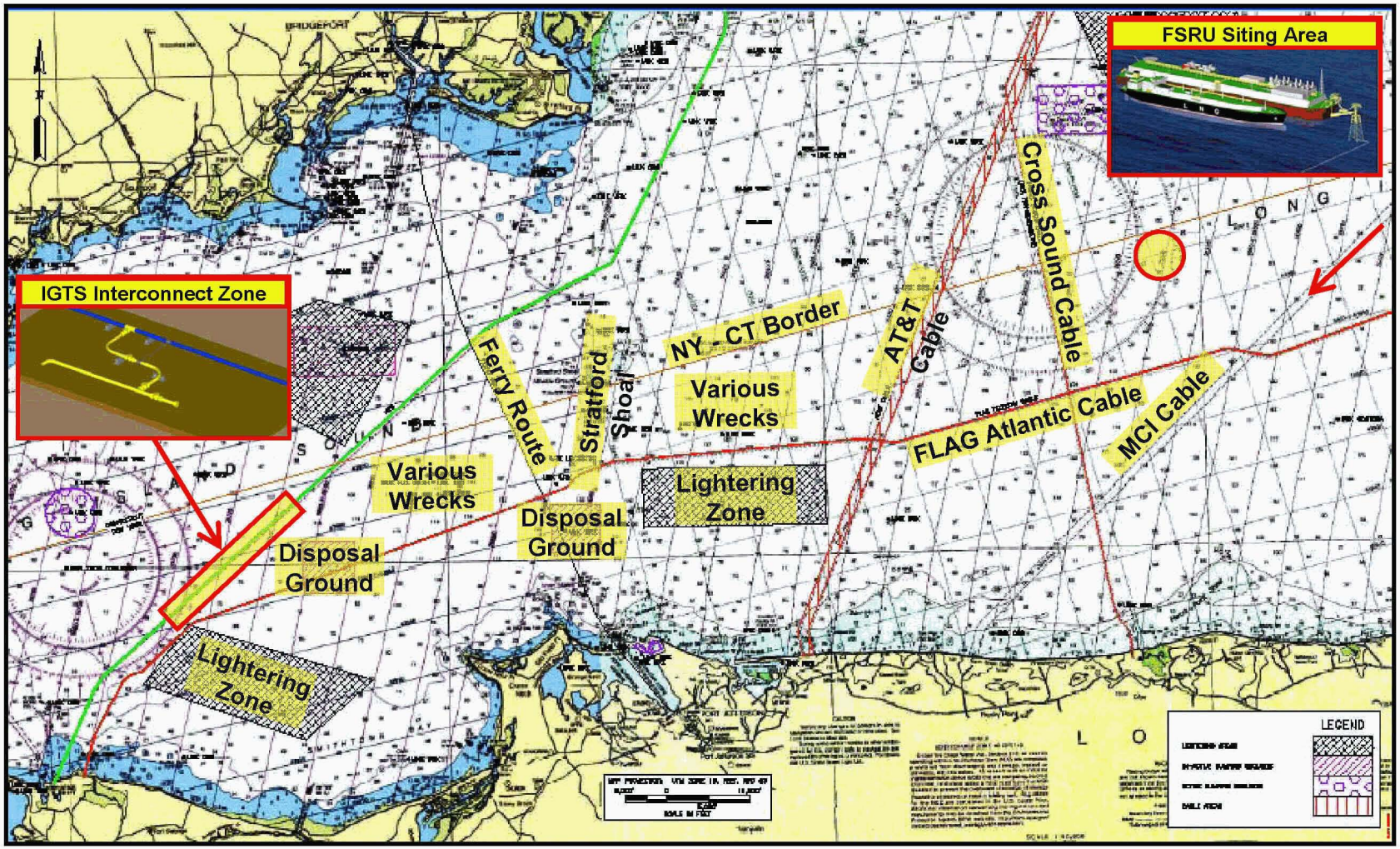
Primary factors considered	Other geographic and regulatory restrictions avoided or minimized
• Public safety; • Environmental impacts; • Coastal resource impacts; • Land-use constraints; • Restricted areas; • Engineering constraints; • Hazards and obstructions; • Pipeline integrity; • Cost efficiency; and • Regulatory implementability. • Other key constraint	• Population concentrations; • Fish spawning areas; • Wildlife and endangered species habitats; • Historical and archeological sites; • Restricted areas such as national parks; • Existing utilities; • Areas of potential erosion; • Bedrock; • Excessively steep slopes; • Seismic conditions; • Existing corridors; • Temporary and permanent access; • Construction schedules; and • Marine traffic routes and anchorages.

Pipeline Location Controls

Location Controls

- **Pipeline Hydraulics: A pipeline length greater than about 28 miles would require additional compression at a self-standing compressor station offshore, resulting in additional impact on the Sound.**
- **FSRU Location: Based on feedback from the fishing community, the preferred location for an FSRU is the northwest corner of Sub-Block 1 and is considered the initial starting control point for all pipeline route considerations.**
- **IGTS Tie-in Location: A 6.5 mile "target area" on the IGTS pipeline in New York waters was established. A preliminarily viable tie-in location was selected during a March 2005 reconnaissance survey to serve as the end-of-line point for all pipeline route considerations.**

Pipeline Corridor Features and Constraints



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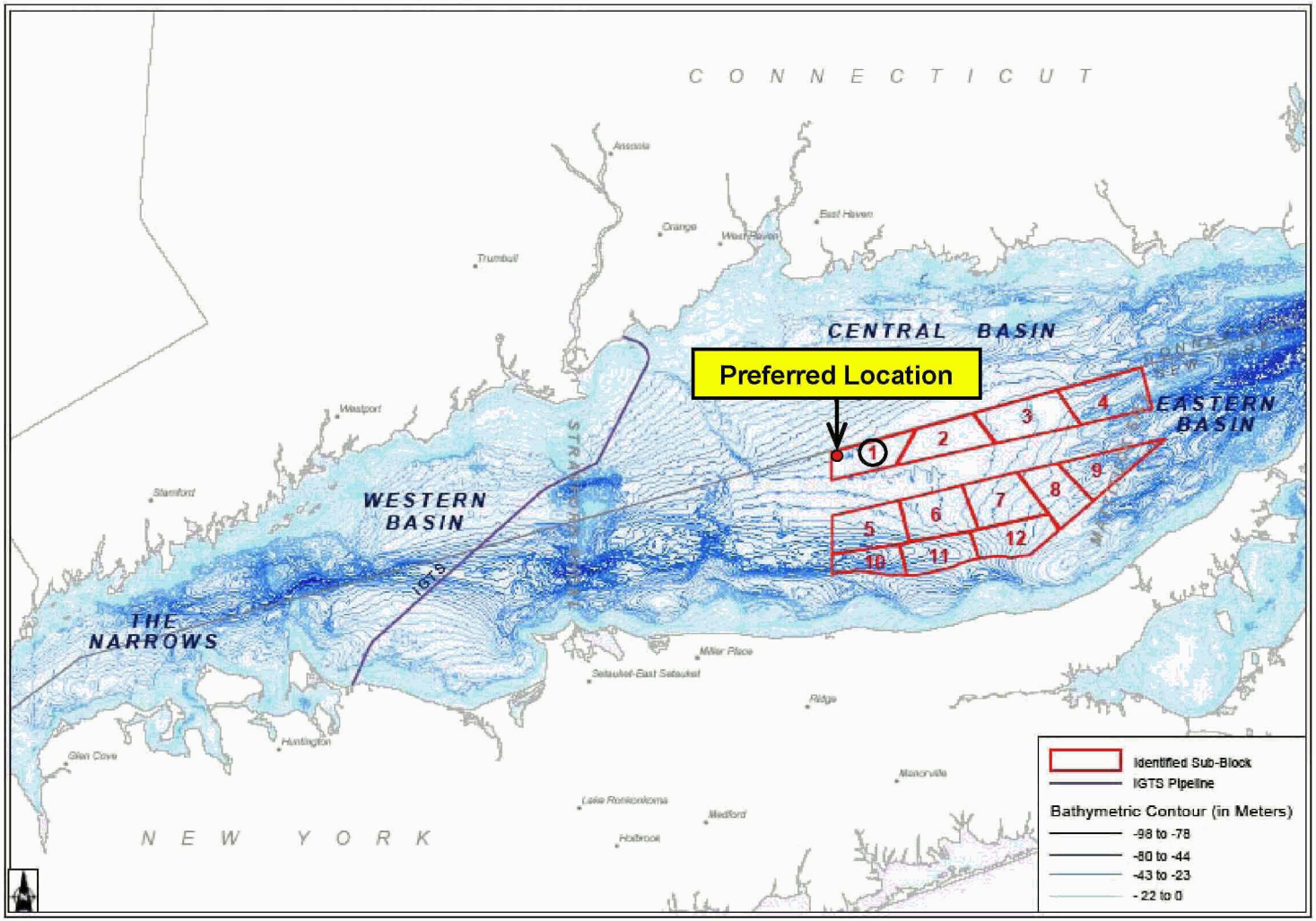
Preferred FSRU Location in Sub-Block 1



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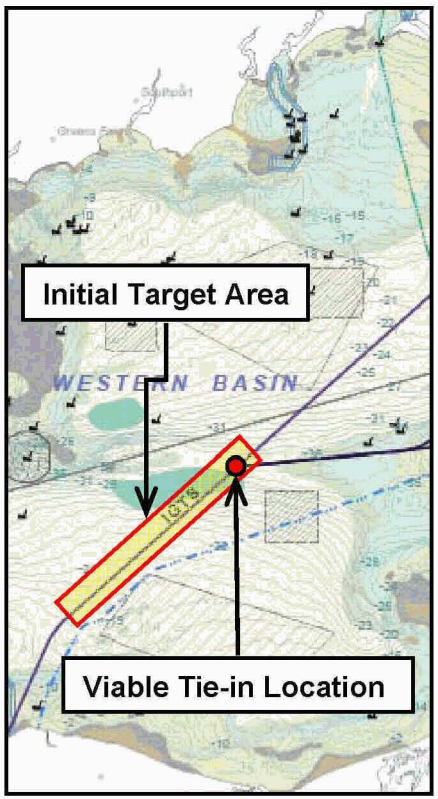
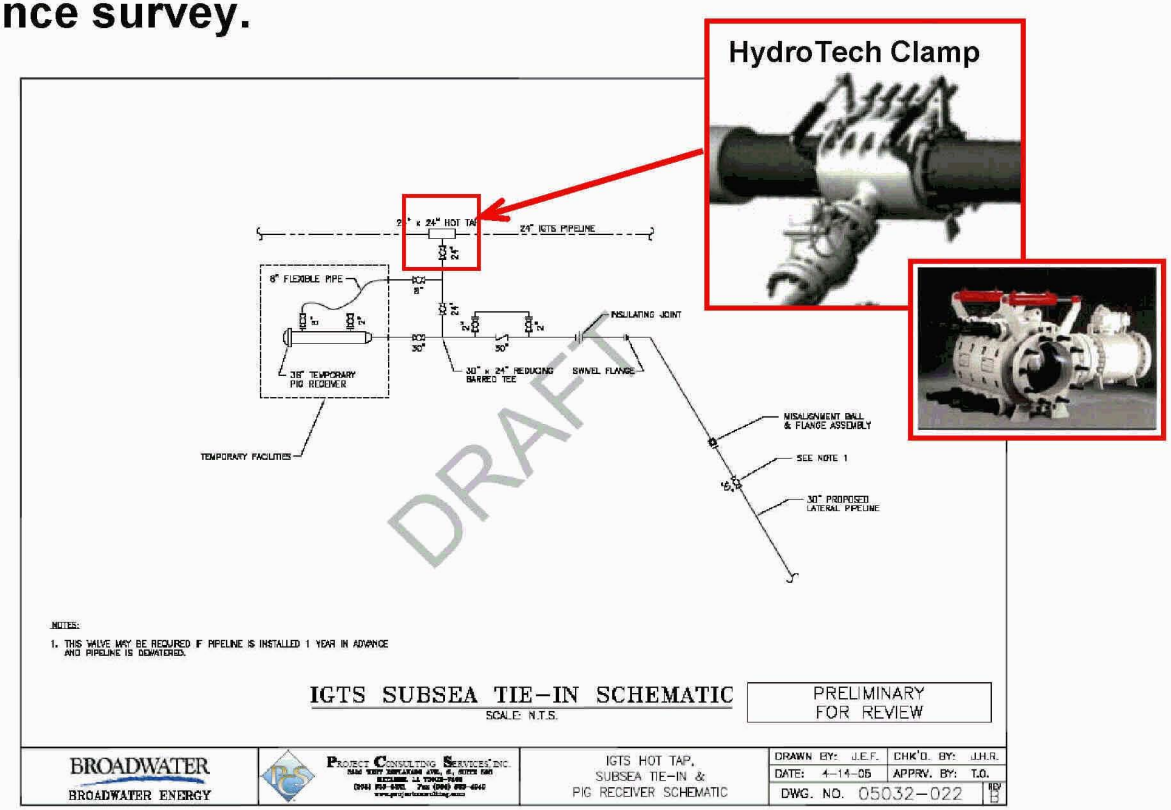
IGTS Interconnect Location

A 6.5 mile "target area" on the IGTS pipeline in New York waters was initially established. A preliminarily viable tie-in location was selected during desk top study and review of IGTS as-built records, then confirmed during a March 2005 reconnaissance survey.





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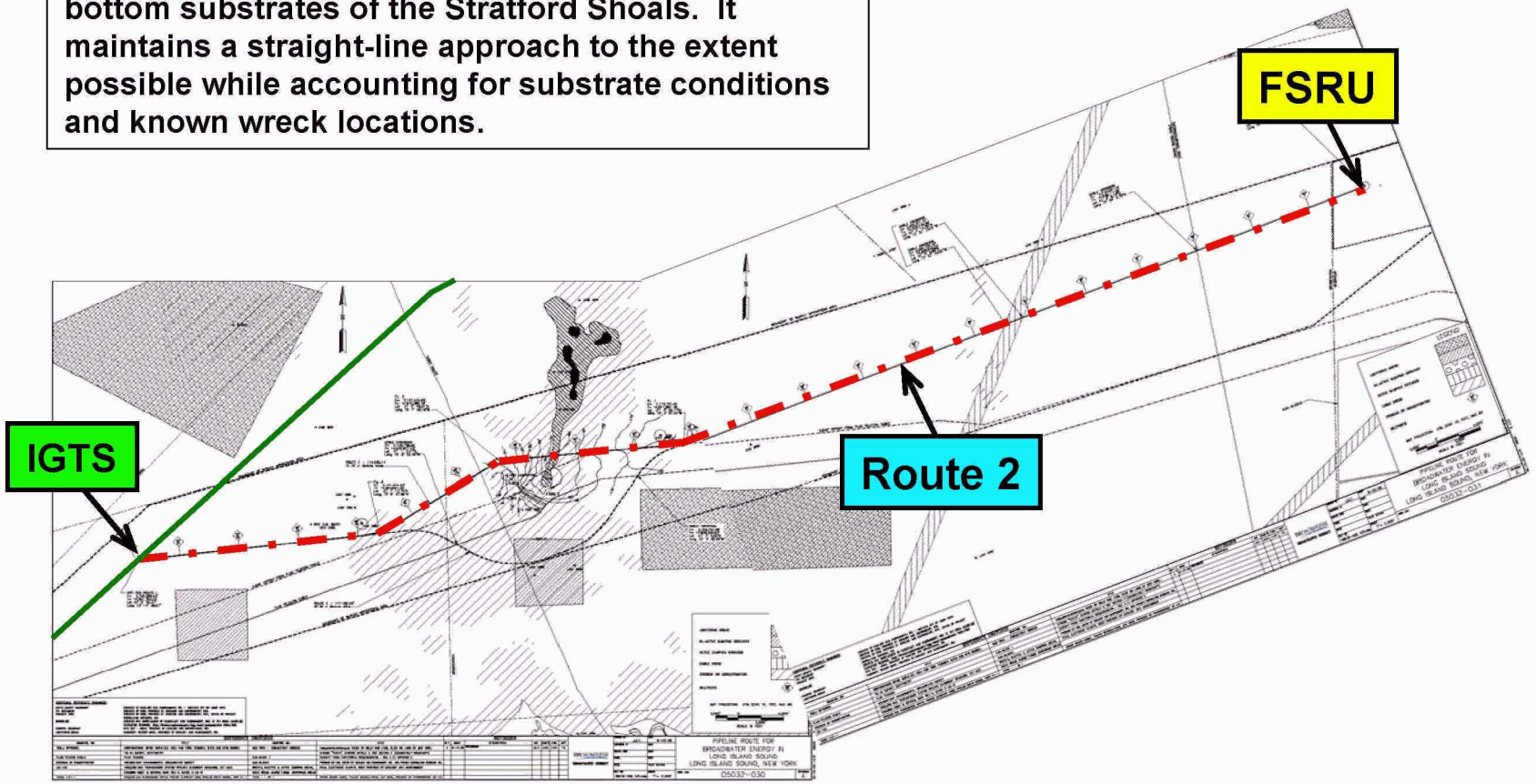
Route 2 – Preferred Alternative

Five routes were evaluated - Route 2 (preferred) is 21.7 miles long and is designed to avoid the harder bottom substrates of the Stratford Shoals. It maintains a straight-line approach to the extent possible while accounting for substrate conditions and known wreck locations.



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Summary (1)

The selected primary configuration of Sub-Block 1 and Route 2 for the FSRU location and the pipeline, respectively, is attributed to certain factors, which include:

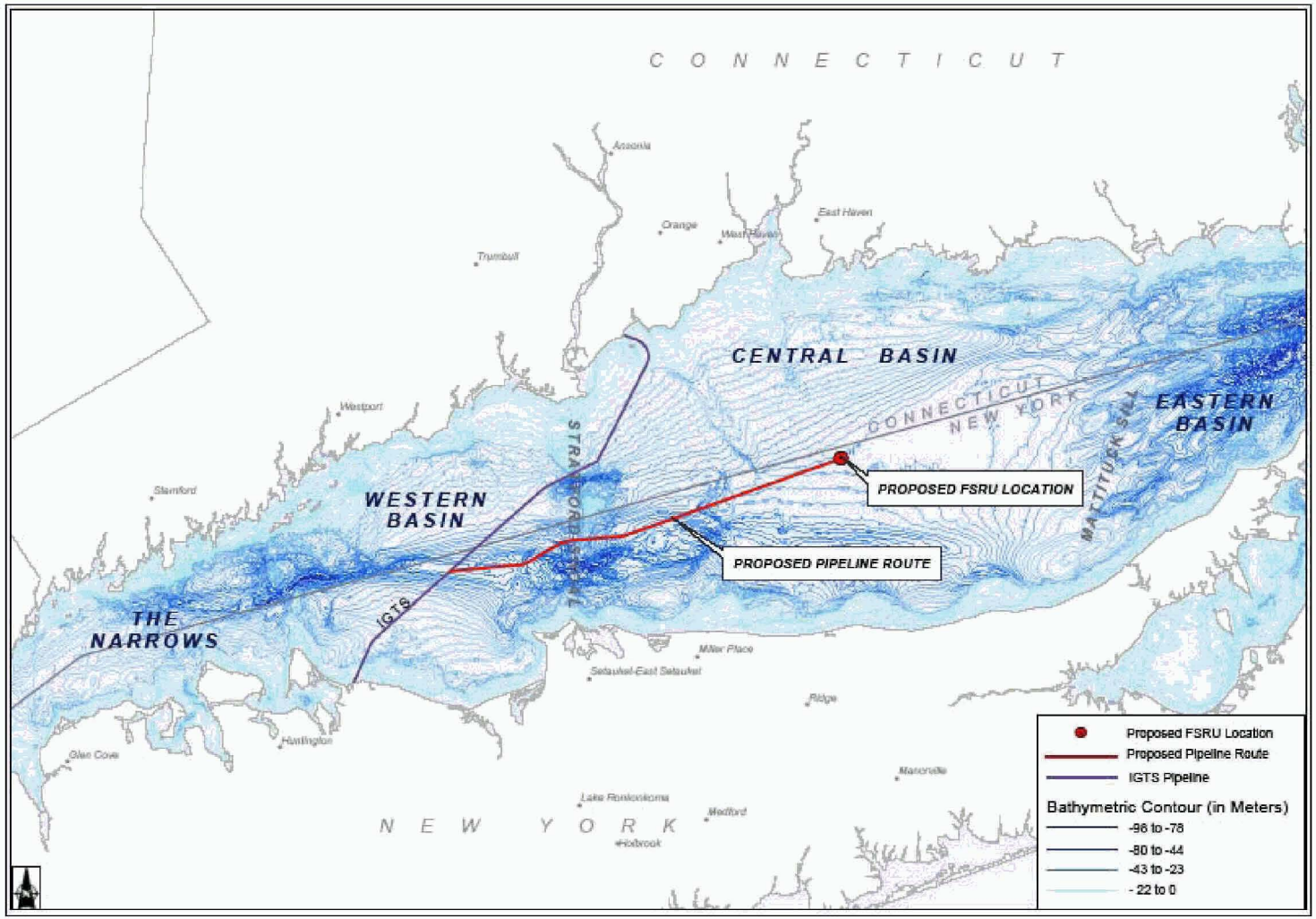
- **The preferred Sub-Block and route are favored with regard to the reduced proximity to populations and areas of intense marine activities, reduced complexity in the construction and operation of the pipeline, and reduced proximity to sensitive environmental and coastal resources;**
- **By establishing the Project in the central portion of the Sound, the Project is largely avoiding the inshore areas that support a significant shell fishery;**
- **The use of FSRU technology provides greater flexibility in siting of the LNG facility;**
- **The FSRU would be placed near the designated shipping routes for access by LNG carriers;**
- **The FSRU would be located in the central portion of the Sound where deeper waters are present resulting in reduced local current velocities;**

continued...

Summary (2)

- The FSRU would be located in an area with adequate water depth for providing sufficient operational safety margins;
- The bottom topography in the preferred Sub-Block is suitable for the location of the FSRU;
- The preferred Sub-Block is located approximately nine miles from shore, which maximizes the safety buffer for onshore locales;
- The preferred Sub-Block and route are not impacted by lightering zones and dumping grounds;
- By locating the preferred Sub-Block and pipeline well offshore, the respective reduction in potential impact to adjacent communities in terms of noise and visual resources would be a realized benefit;
- The preferred Sub-Block and pipeline route are implementable from a regulatory standpoint; and
- The preferred pipeline route reduces the number of crossings of third-party communication and power cables.

Basis of FERC Application - January 2006



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FERC EIR #2 Responses - March 2006 (1)

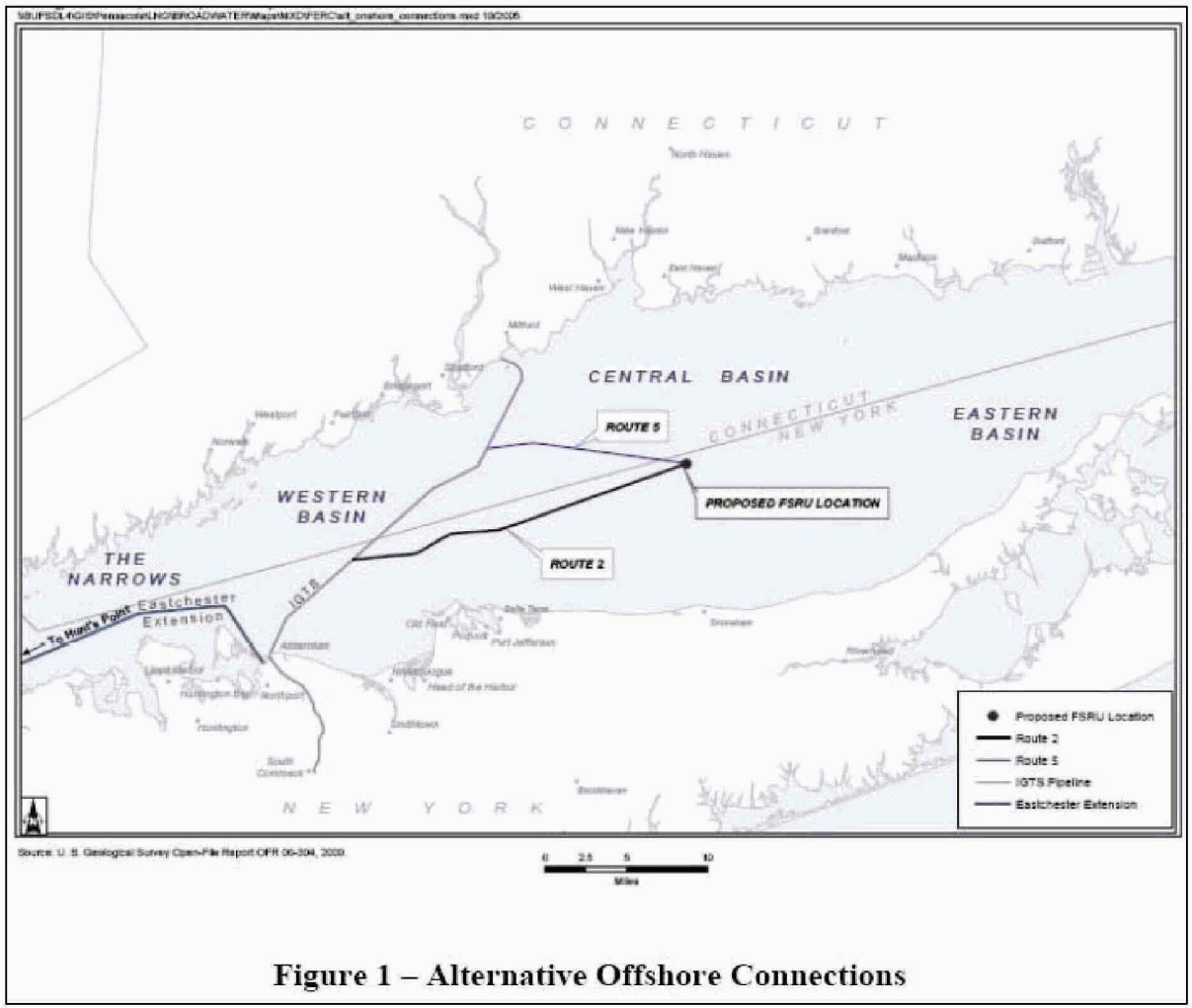

Figure 1 – Alternative Offshore Connections

EIR 2-10

Evaluation of Alternative Route 5 pipeline hydraulics for an IGTS interconnection point in CT waters

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FERC EIR #2 Responses - March 2006 (2)

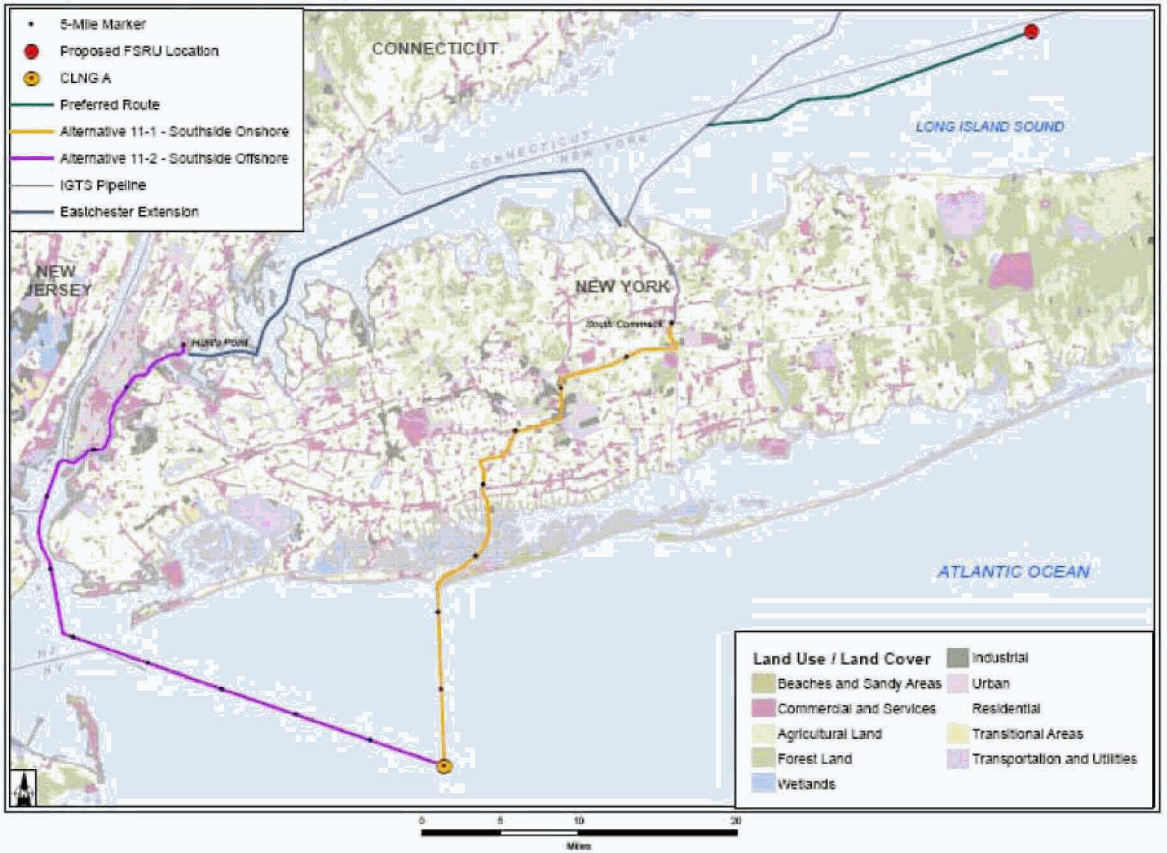

Figure 1 Alternative Pipeline Routes 11-1 and 11-2 from CLNG A

EIR 2-11

Evaluation of alternative pipeline routes from an offshore LNG terminal south-west of Long Island to an interconnection with IGTS

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FERC EIR #2 Responses - March 2006 (3)

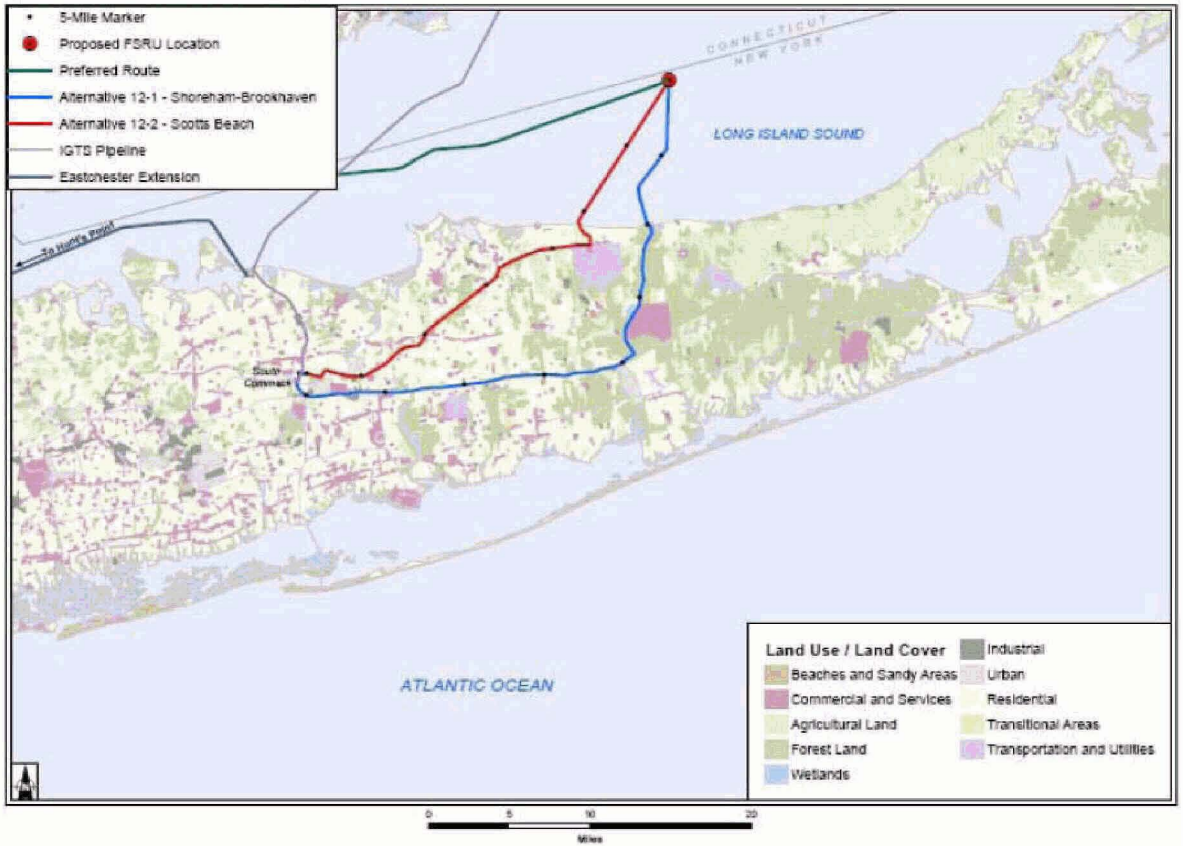

Figure 1 Alternative Pipeline Routes 12-1 and 12-2 from FSRU

EIR 2-12

Evaluation of alternative pipeline routes from the proposed FSRU site to an onshore interconnection with IGTS

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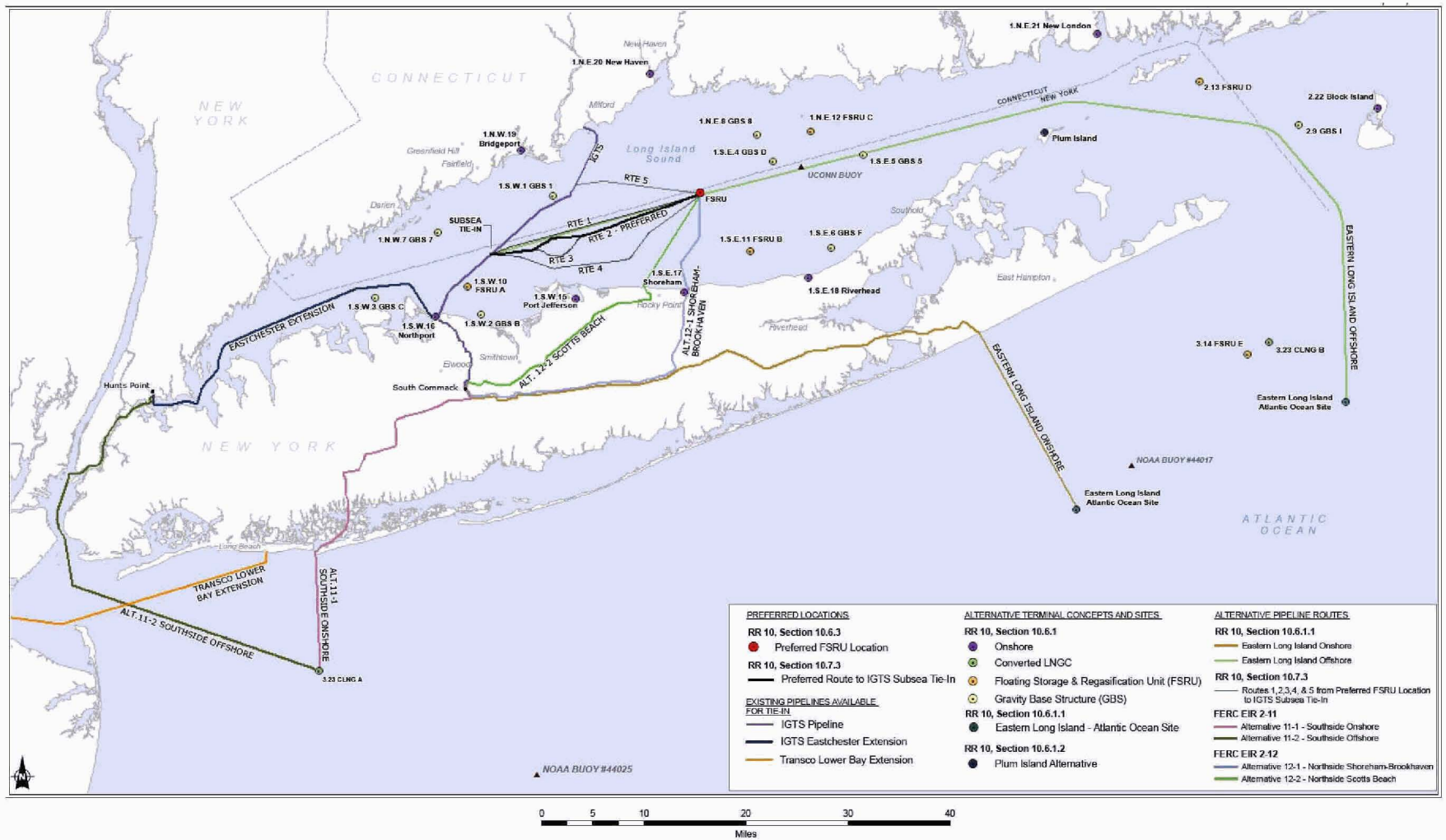
Overview of Terminal & Pipeline Alternatives



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Offshore Regasification Alternatives

Alternatives Reviewed

Floating Storage and Regas Unit (FSRU)

- Double-hulled barge
- LNG storage within hull
- Used in wide range of water depths
- Siting flexibility

Shuttle Regasification Vessel (SRV)

- Specialized LNG vessels that contain onboard regasification equipment
- Capacity 400 – 500 mmcf/d
- Storage 138,000 – 150,000 m^3

FSRU vs. SRV – Comparative Analysis (1)

Feature	Broadwater (Yoke Moored FSRU)	Turret Moored FSRU	Shuttle Regasification Vessel (SRV)	Comments
Location	Long Island Sound	Atlantic Ocean	Atlantic Ocean	
Cryogenic Storage (permanent location)	350,000 m^3	350,000 m^3	None – no dedicated storage facility	
Preferred Water Depth	15 m to 30 m	50 m or more required	85 m to 350 m (model tests completed for 40 m to 900 m)	15 m is the minimum water depth for LNG carrier operations in sheltered waters.
Sea Bed Impact	1,225 m^2	6 or 8 leg anchor system plus anchors extending 1,000 m horizontally from the turret (distance will increase with water depth)	6 or 8 leg anchor system plus anchors extending up to 1,000 m horizontally from the buoy (for 80 m water depth)	Requirements will vary according to sea bottom conditions and water depth.
Number of units required to supply 1 bcfd	1	1	3	

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FSRU vs. SRV – Comparative Analysis (2)

Feature	Broadwater (Yoke Moored FSRU)	Turret Moored FSRU	Shuttle Regasification Vessel (SRV)	Comments
Terminal Surface Use Area	548,000 m^2 (full turn of FSRU)	548,000 m^2 (full turn of FSRU)	22,000,000 m^2 (assumes three buoys arranged symmetrically around a center platform)	No allowance made for safety zones or maneuvering areas in areal estimates.
Separate Metering/ Compression Platform Required	No	Possibly	Yes	
Distance from Nearest shore	9 miles (8 nautical miles)	17.3 miles (15 nautical miles)	17.3 miles (15 nautical miles)	
Pipeline Beach Crossing	No – Iroquois subsea connection	Yes – to bring natural gas ashore, or a subsea pipeline of 100 or more miles	Yes – to bring natural gas ashore, or a subsea pipeline of 100 or more miles	
Onshore Pipeline Construction	No	Yes	Yes	

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FSRU vs. SRV – Comparative Analysis (3)

Feature	Broadwater (Yoke Moored FSRU)	Turret Moored FSRU	Shuttle Regasification Vessel (SRV)	Comments
Marine Operability (Berthing and Mooring Operations)	2.0 m waves 17.0 m/s wind (33 knots) 0.45 m/s current	2.0 m waves 17.0 m/s wind (33 knots) 0.45 m/s current	Predominantly limited by sea states of 5-6 m or higher but offloading will be constrained by ability of LNG carrier to discharge in worsening weather conditions	Limiting case is a combination of wind, wave and current conditions. Effectiveness of tugs is typically a controlling factor in marine operability (weathervaning FSRU improves berth operability)
Potential Marine Uptime	98%	<75% using conventional offloading technology due to weather constraints	98% - no allowance made for vessel voyage delays	
Modified LNG Carrier Design Requirement	No – accommodates industry standard LNG carriers	Yes	Yes	Tandem offtake system most probably required for FSRU moored in the Atlantic Ocean.

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FSRU vs. SRV – Comparative Analysis (4)

Feature	Broadwater (Yoke Moored FSRU)	Turret Moored FSRU	Shuttle Regasification Vessel (SRV)	Comments
Capital Cost	Moderate	Moderate but individual LNG carrier costs will be higher for tandem offtake modifications	Low for mooring facilities but individual LNGC costs are about 15% greater than conventional vessels	
Operating Cost	Moderate	Moderate	High - vessel utilization is low (+/- 6 days to discharge)	Assumes use of submerged combustion vaporizers or shell and tube vaporizers

Summary – FSRU vs. SRV

- FSRU would ensure a continuous supply of natural gas to the Region by providing on-site storage versus a likely intermittent supply from SRVs, which would require the continued presence of an LNG carrier for storage
  - Supply reliability is key consideration for a baseload supply facility
- FSRU in Long Island Sound will require significantly less associated infrastructure (on- and offshore pipeline facilities), and therefore less overall environmental impact than a SRV located off the Atlantic Coast of Long Island

Ocean Conditions

FSRU Operational Limits

Operability based on consideration of:

- FSRU and LNG relative motions
- Mooring system
- Tug performance
- Other factors (mooring lines, fenders, etc.)

Operational Limit	Significant Wave Height		Wind Velocity		Current Velocity	
	(m)	(ft)	(knots)	(mph)	(knots)	(ft/sec)
Approach Limits	2	6.6	33	38	0.9	1.5
Side-by-Side Mooring Limits	3	9.8	39	45	0.9	1.5
Departure Limits	2	6.6	33	38	0.9	1.5

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Tug Support Requirements

Operation	Winter	Summer
Small LNG Carrier Berthing	3 tugs	3 tugs
Small LNG Carrier Unberthing	2 tugs	2 tugs
Large LNG Carrier Berthing	4 tugs	3 tugs
Large LNG Carrier Unberthing	3 tugs	2 tugs

Tug performance diminishes in seas greater than 1.5 meters

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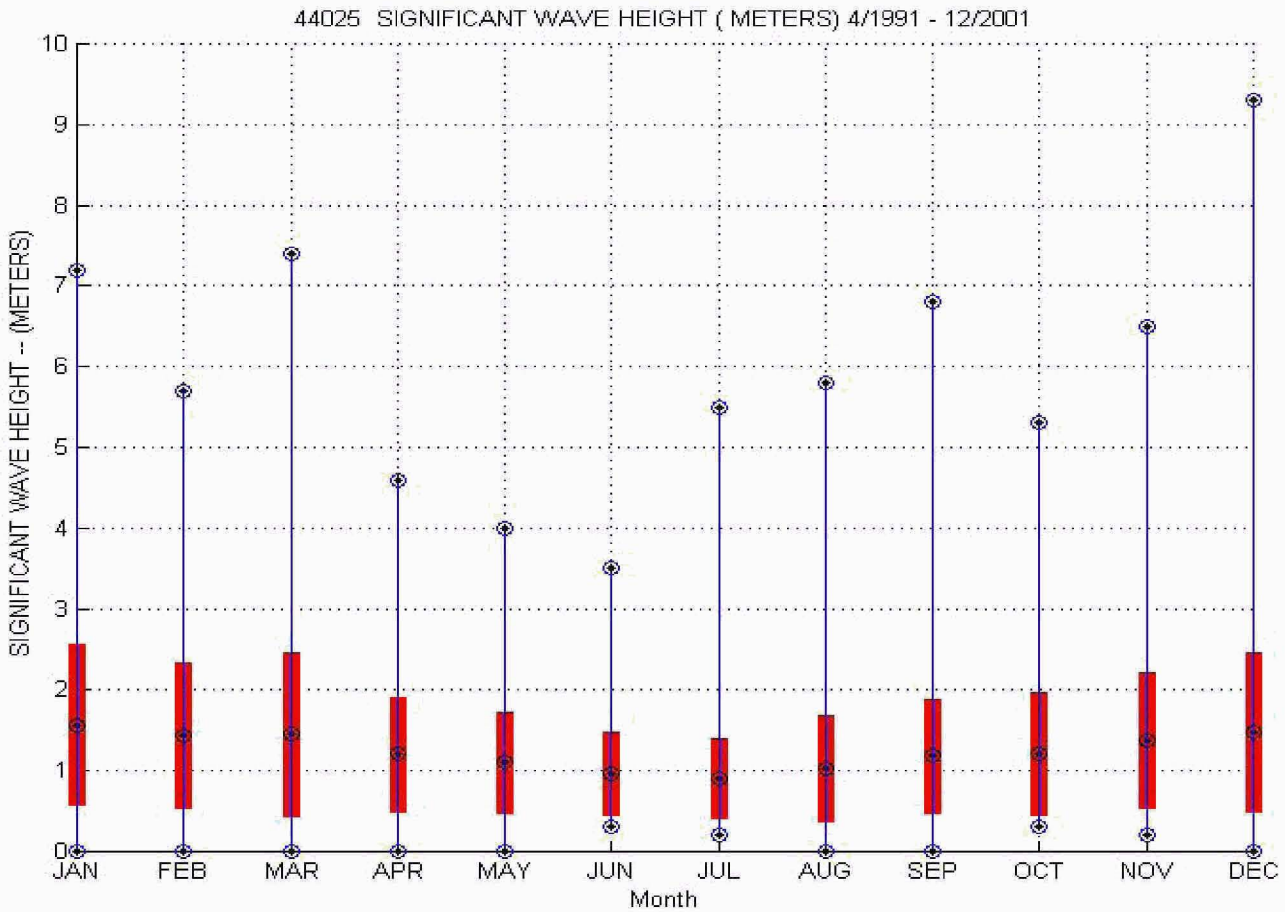
Station 44025 – Historical Wave Heights



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Ocean Conditions - Summary

- Marine operability addressed in site and concept selection work
- Reviewed historical data for NOAA buoys #44025 and 44017 as well as Hydrobase database (ship observations)
- Data review showed wave heights exceed 2 meters a significant proportion of the time, particularly in winter months
- Supported by FERC DEIS review (p. 4-29)
  - Threshold (2 m) exceeded 18% of the time
  - Threshold exceeded 22% of the time in winter months
- Least reliable operation (winter) when reliability is most important
- Design for extreme events is significantly greater in open ocean
  - 9.3 m (30.5 feet) wave event in 1992
  - 3.8 m (12.5 feet) highest wave during 1938 Hurricane

Pipeline Considerations

Regional Pipeline Grid

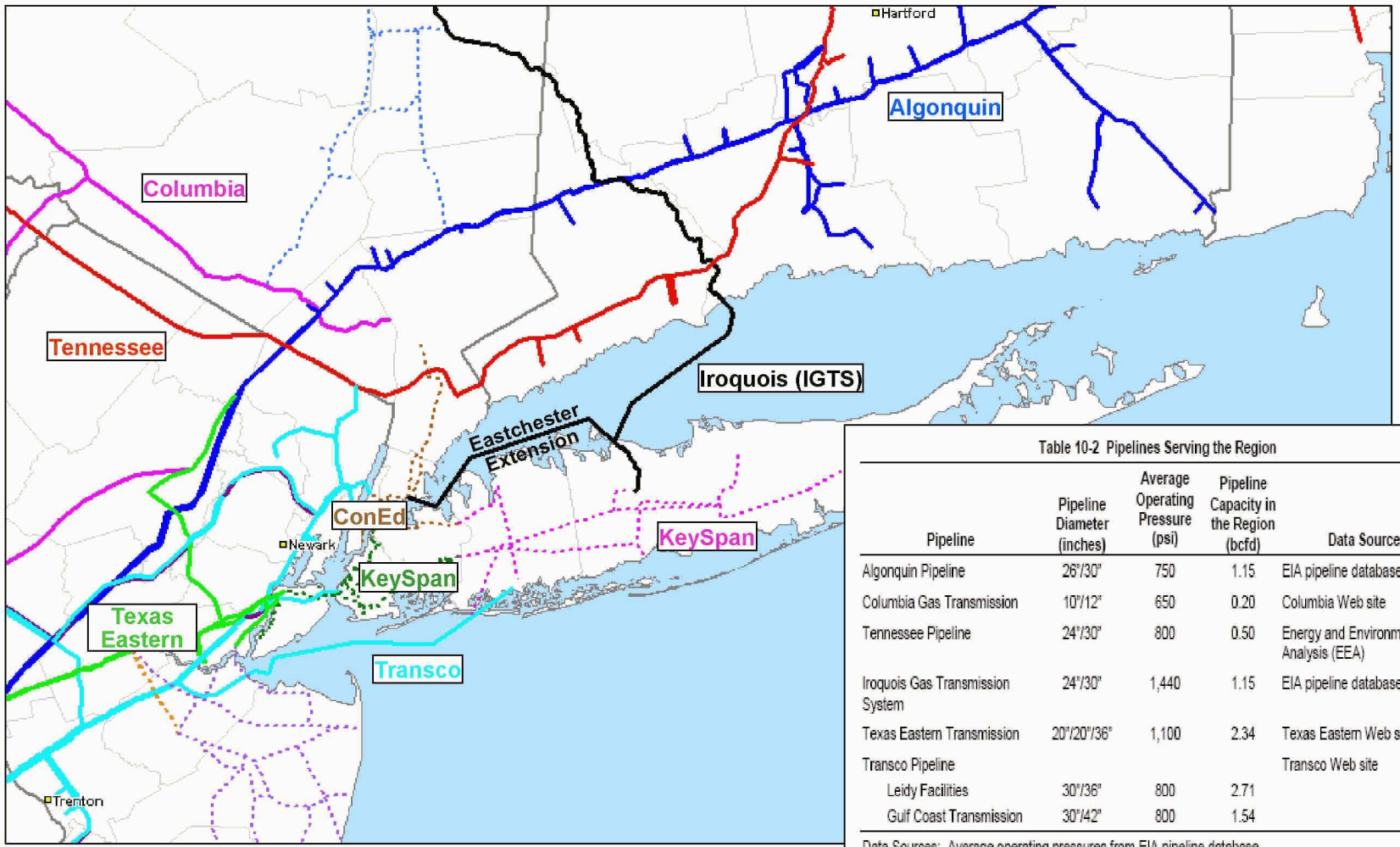

Table 10-2 Pipelines Serving the Region

Pipeline	Pipeline Diameter (inches)	Average Operating Pressure (psi)	Pipeline Capacity in the Region (bcfd)	Data Sources
Algonquin Pipeline	26"/30"	750	1.15	EIA pipeline database
Columbia Gas Transmission	10"/12"	650	0.20	Columbia Web site
Tennessee Pipeline	24"/30"	800	0.50	Energy and Environmental Analysis (EEA)
Iroquois Gas Transmission System	24"/30"	1,440	1.15	EIA pipeline database
Texas Eastern Transmission	20"/20"/36"	1,100	2.34	Texas Eastern Web site
Transco Pipeline				Transco Web site
Leidy Facilities	30"/36"	800	2.71	
Gulf Coast Transmission	30"/42"	800	1.54	

Data Sources: Average operating pressures from EIA pipeline database.

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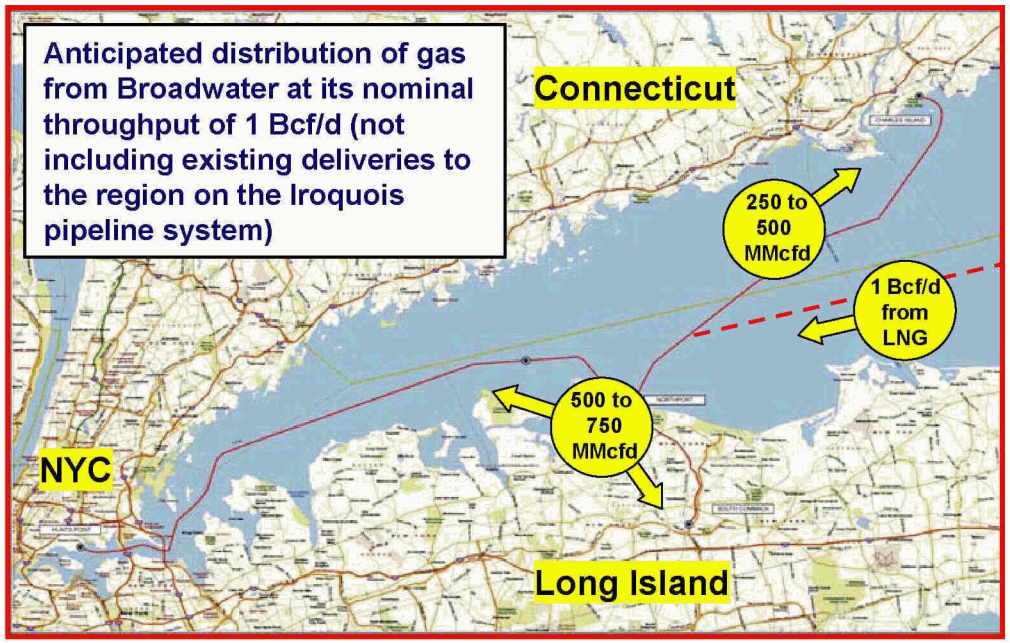
Regional Market Access via Iroquois



IGTS is a 411-mile interstate natural gas pipeline from Waddington, NY through western CT to Long Island, and from Huntington to the Bronx. It's position in the N.E. enables shippers to reach numerous LDCs throughout New England, NY and NJ (via exchanges), and numerous electric generators in ISO New England and ISO NY

Current interconnects on Iroquois in the NY/CT Region:

Long Island
- KeySpan (Northport)
- KeySpan (Sth. Commack)

New York City
- ConEd (Hunts Point, Bronx)

Connecticut
- Yankee Gas
- Southern Connecticut Gas
- Bridgeport Power
- Milford Power
- Devon Power
- Algonquin Gas Pipeline
- Tennessee Gas Pipeline

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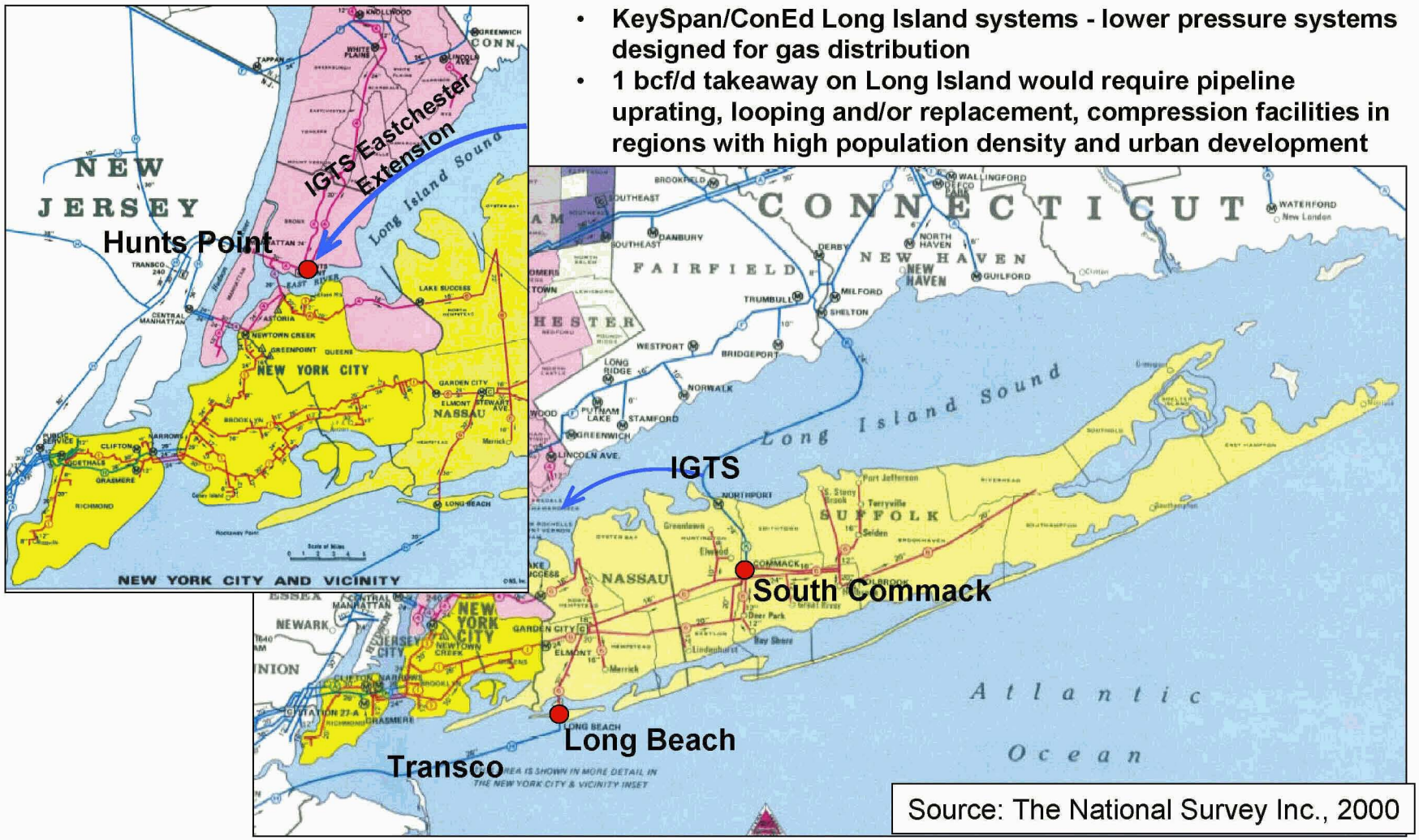
New York City Access Considerations

- KeySpan/ConEd Long Island systems - lower pressure systems designed for gas distribution
- 1 bcf/d takeaway on Long Island would require pipeline uprating, looping and/or replacement, compression facilities in regions with high population density and urban development



Source: The National Survey Inc., 2000

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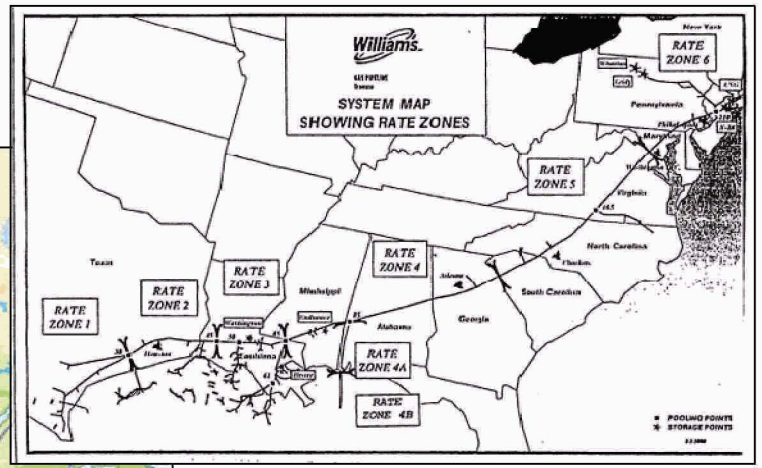
Williams' Transco Facilities

Williams' Transco pipeline system extends from South Texas and Western Pennsylvania to New York City. It transports gas from the Gulf Coast to 12 Southeast and Atlantic Seaboard states, including major metropolitan areas in NY, NJ and PA



System Design Capacity	8.1 billion cubic feet per day
Seasonal Storage	216 billion cubic feet
Supply Areas	Gulf Coast
Market Areas	Southeast, Mid-Atlantic, and Northeastern states
Miles of Pipeline:	10,560 miles
Compressor Stations	43

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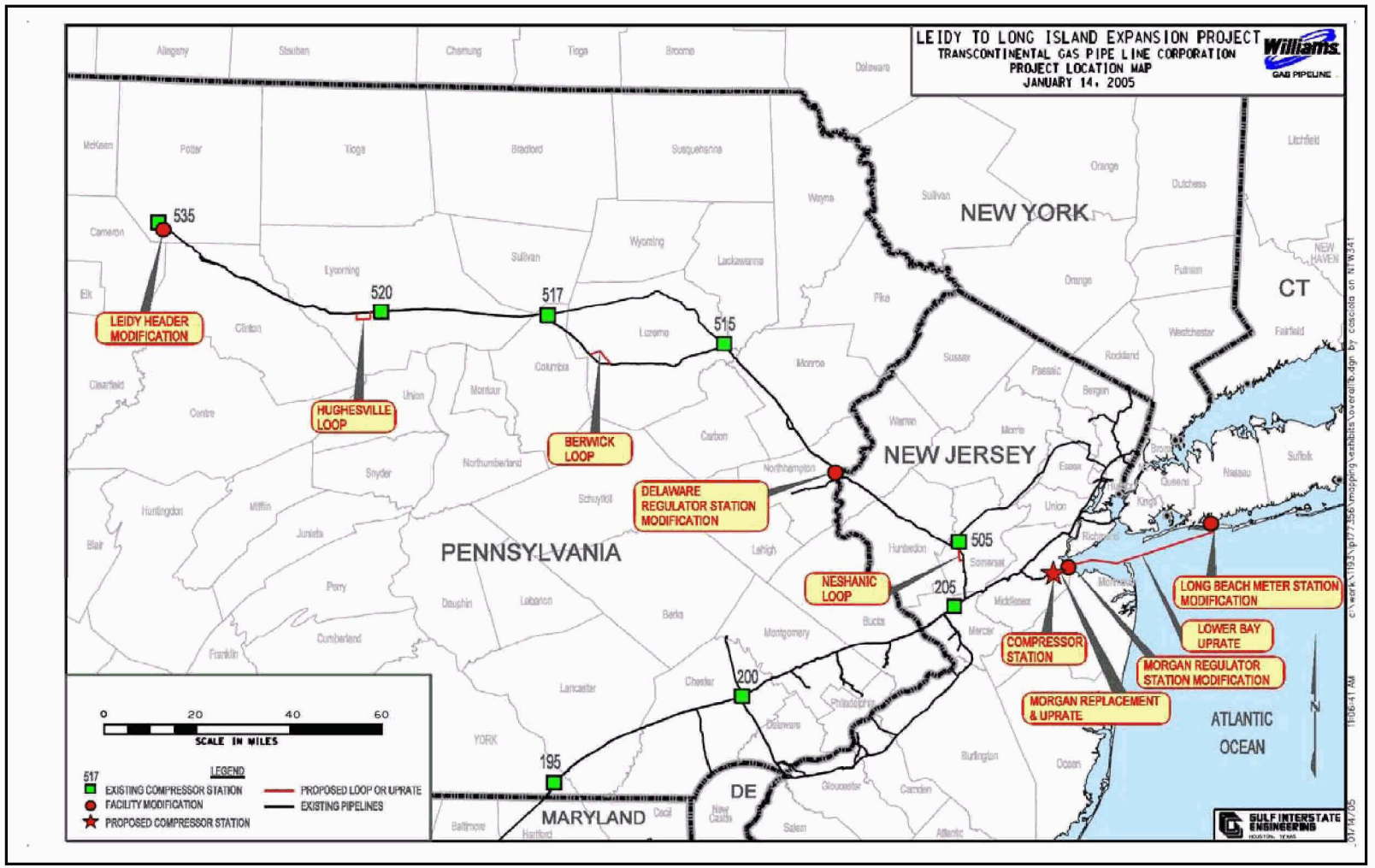
Transco Leidy to Long Island Expansion Project



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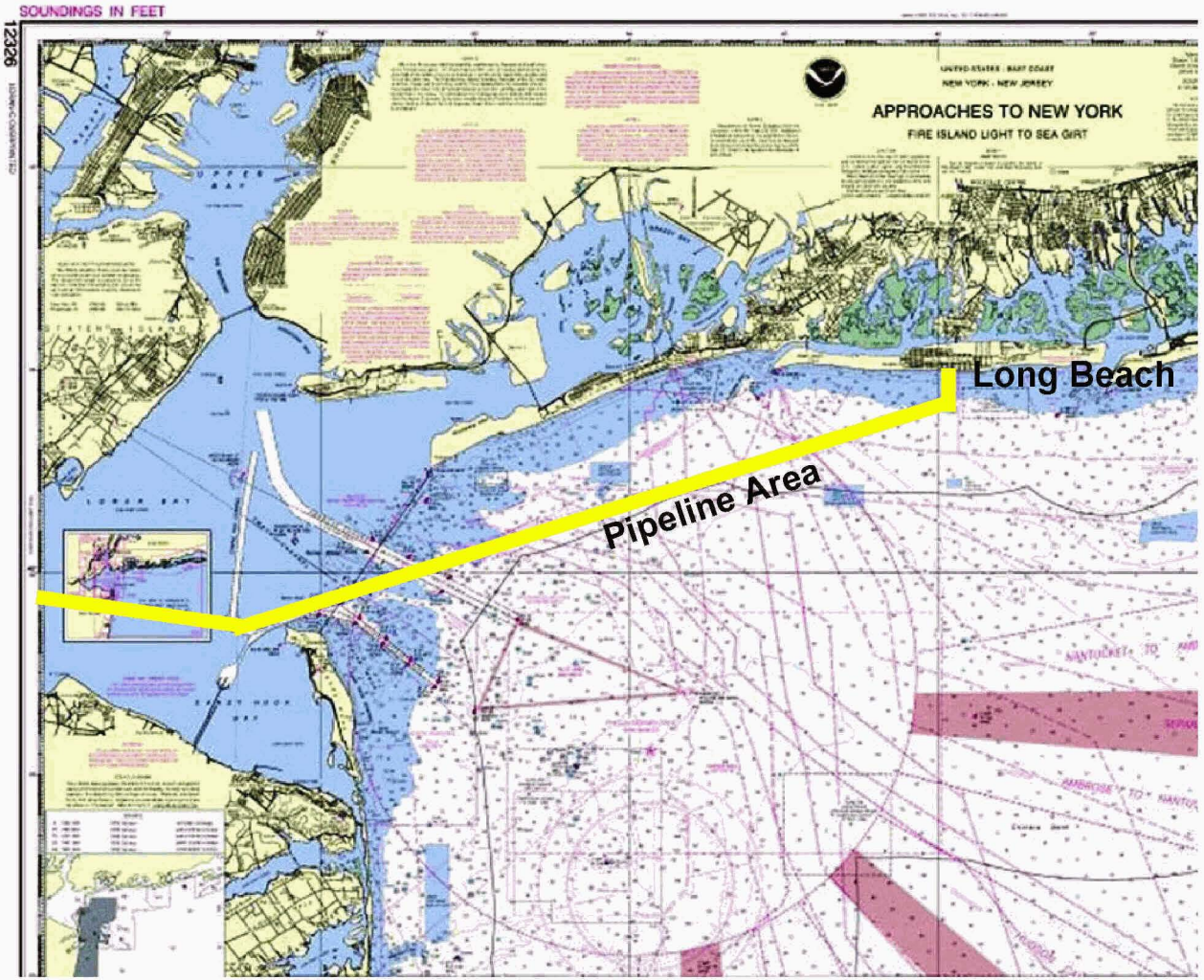
Transco Lower Bay Extension



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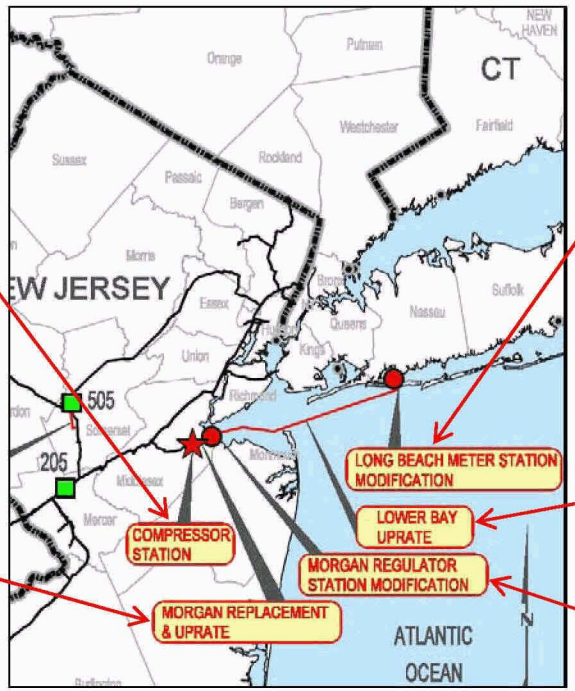
Transco Expansion Facilities Serving Long Island

Modifications in New Jersey and Long Island required to increase throughput of the Lower Bay Extension from 600 MMcfd to 700 MMcfd (FERC Docket No. CP06-34-001)

Installation of two 5,000 HP electric motor-driven compressor units (10,000 total HP) at a new compressor station in Middlesex County, New Jersey (Compressor Station No. 207)

Replacement of approximately 2.45 miles of 42-inch pipeline and the uprating of approximately 3.53 miles of 42-inch pipeline between Mile Post 8.50 and Mile Post 12.03 on Transco's existing onshore portion of the Lower New York Bay Mainline "C" in Middlesex County, New Jersey



Modifications to Long Beach Meter Station in Nassau County, New York, including 3 new gas heaters originally addressed as nonjurisdictional facilities to be installed by KeySpan

Uprating of 33.66 miles of Transco's existing 26-inch Lower New York Bay Extension, from Mile Post 12.05 to Mile Post 45.71 from a MAOP of 800 psig to 960 psig

Modifications to Morgan Regulator Station in Middlesex County, New Jersey

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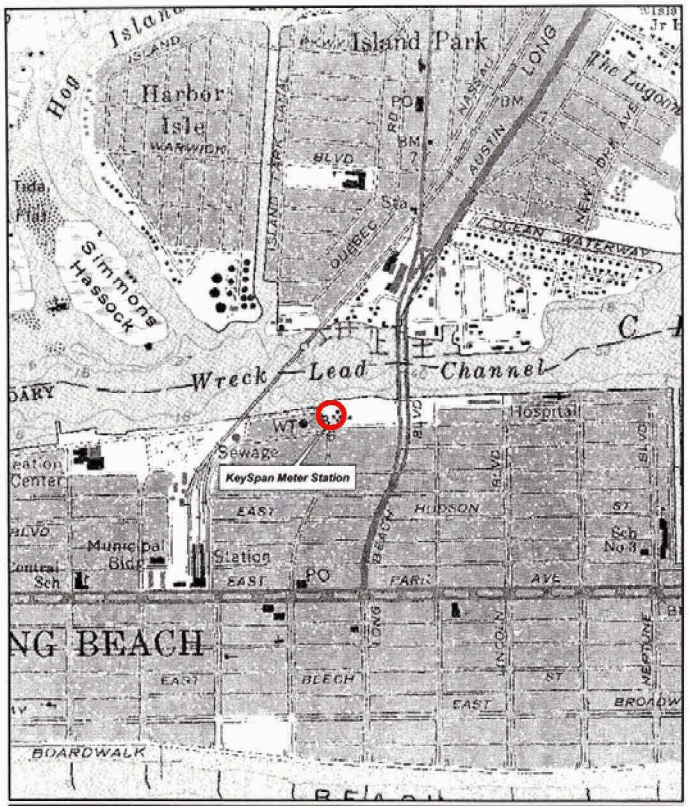
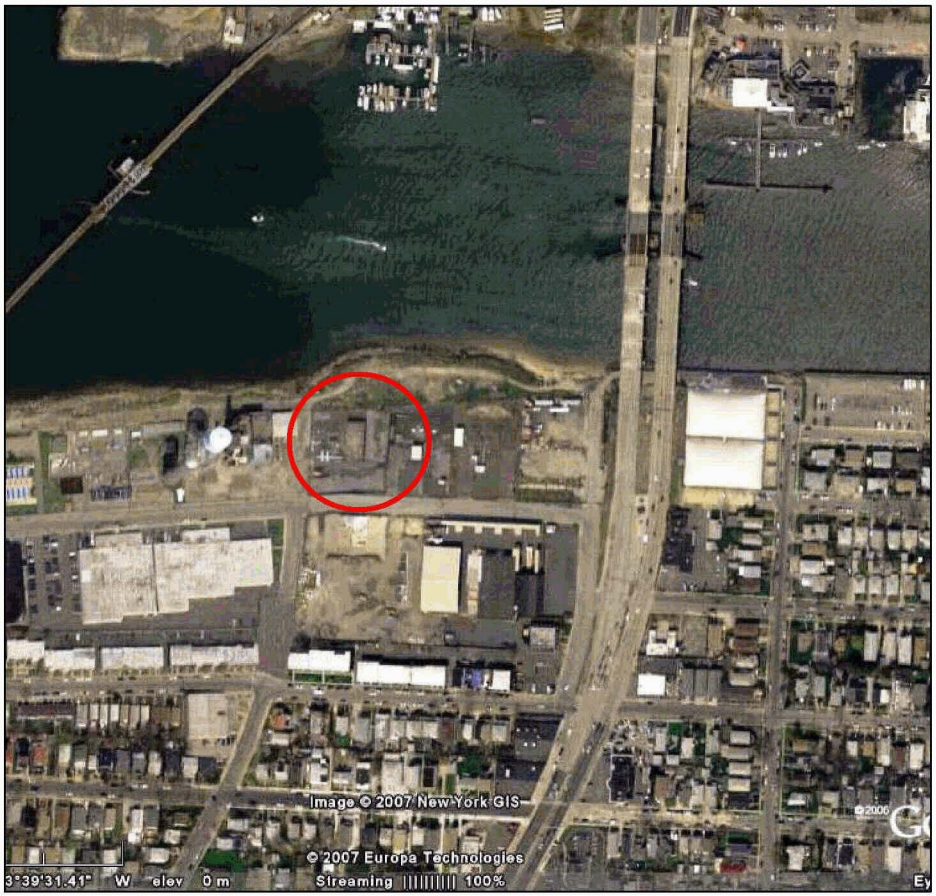
KeySpan Long Beach Meter Station



CP06-34-001
KeySpan Meter Station Site



Transco system terminates at Long Beach

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NYSDOS Atlantic FSRU Sendout Pipeline

Segment	Length (miles)	Description
Long Island Sound Offshore	3.5	Little Neck Bay shore crossing to subsea tie-in with IGTS Eastchester Pipeline in Long Island Sound
Long Island Onshore	18	Along Long Beach city streets then parallel to Long Island Railroad and Cross Island Parkway to Little Neck Bay on Long Island Sound
Atlantic Offshore	8	Subsea from FSRU to shore crossing at Long Beach terminus of established offshore Pipeline Area
TOTAL	**29.5**	**FSRU to IGTS**

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Iroquois System Advantages

- High pressure, efficient header system
- Multiple downstream connections
- Can accommodate 1 bcf/d of incremental supply with no compression or pipeline looping (and related coastal impacts)
- Well positioned for regional (New York City, Long Island and Connecticut) access

Questions and Follow-up Issues

- Issues for discussion at a future meeting
- Data requirements

Next Steps

- Process for moving forward
- Scope and date for next meeting

Broadwater Energy

Second Technical Data Meeting

Meeting with New York Department of State
Coastal Resources Division

May 2, 2007
Albany, New York

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Delivery Reliability (1)

- Utility winter heating season – November to March

- Battelle report projections:
  - Considered wave height constraints only
  - Inability to conduct berthing/unberthing operations (Dec-Feb):
    - PL1/S1A: 7%
    - PL2/S2: 14%
    - PL3/S3: 16-17%

  - Inability to conduct berthing/unberthing operations for 8 days:
    - PL1/S1A: <1% of the time
    - PL2/S2: 3% of the time
    - PL3/S3: 4% of the time

Delivery Reliability (2)

- Other reliability considerations:
  - Equipment reliability – facility design (fatigue) and availability
  - Ship delivery reliability – LNG carriers – long delivery distances and related weather conditions
  - FSRU design capacity of 1.25 bcf/d – higher rate during winter months, therefore greater risk of facility depletion
  - Potential for depletion is greater than wave-related operability alone (typically analyzed through simulation)

From	To	Distance (Nautical Miles)	Steaming Time (Days)
Trinidad	New York	1932	4.5
Nigeria	New York	5111	11.8
Algeria	New York	3463	8.0
Norway	New York	3908	9.0
Qatar	New York	8186	20.0

- Baseload LNG facility (single supply connection) requires comparable or greater delivery reliability than pipeline system – gas buyers insist on reliable delivery and will not subscribe for interruptible supplies in large quantity

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Technical Considerations - Atlantic Sites

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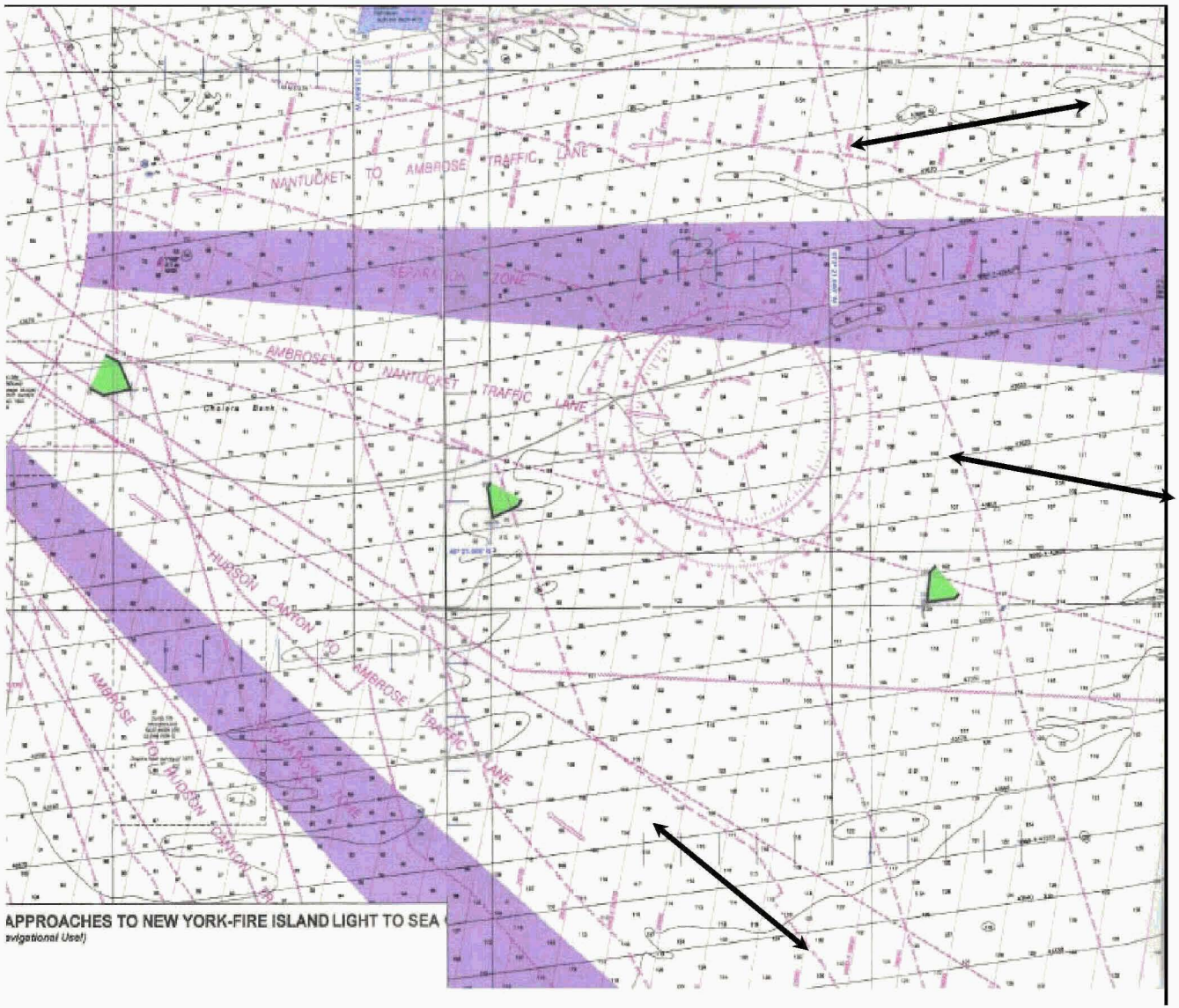
Proposed Atlantic Locations



- Collision risk much greater than for Long Island Sound - ship traffic to NY/NJ Harbor is far greater
- All large ships (20,000 dwt and up) and foreign vessels entering Long Island Sound will have a pilot onboard – not true for ships in proposed Atlantic locations

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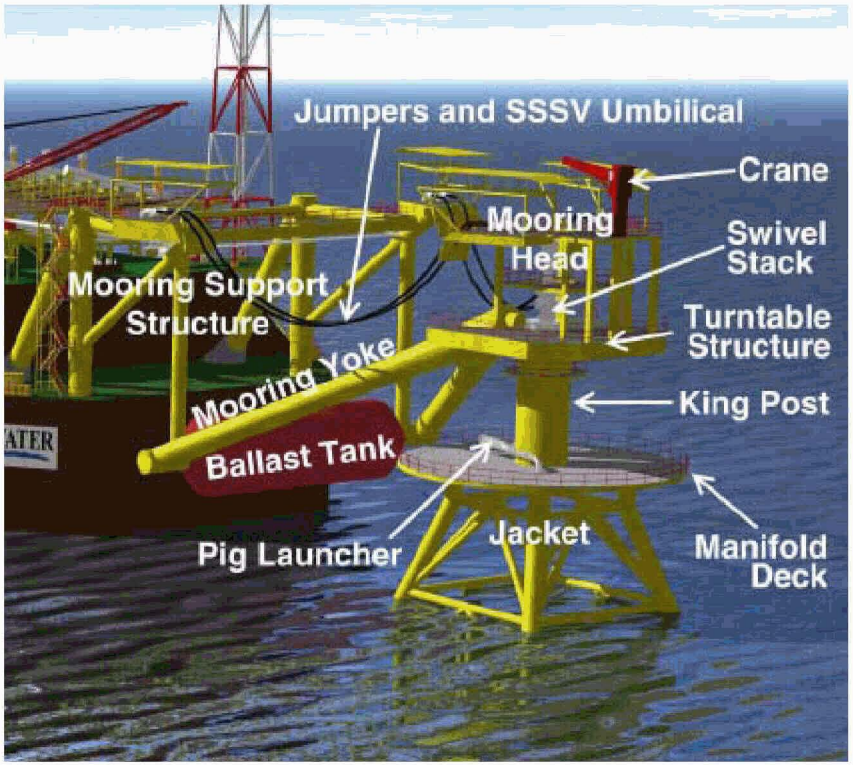
Mooring System Design Considerations



YMS Design Criteria in LIS - Waves	
Operational	95% of the time with Hs < 1.2 m
Extreme 1:100 year	H_s= 4.3 m & T_p=7.4 s
Extreme 1:1,000 - 1:10,000	H_s= 5.7 - 7.0 m & T_p=8.7 – 9.9 s

- Yoke and mooring tower must anchor both the FSRU and LNG carrier when berthed
- Pre-Katrina Gulf of Mexico design criteria is for 1:100 year storm event
- Current Broadwater design is for a Category 5 hurricane and for extreme wave event
- Atlantic locations have seen a 9 meter wave event in last 15 years; statistical design projections will be correspondingly greater, or will provide reduced level of design factor

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YMS Design Criteria - Worldwide

Project Name		FPSO VI	Shell EA	QHD Bohai Bay	SZ36 Bohai Bay	CFD Bohay Bay
Location	**Units**	**Nigeria**	**Nigeria**	**China**	**China**	**China**
Water depth at site	m	41.2	26.4	20.0	32.0	24.2
Design Sea Conditions (100 year return)						
Significant Wave Height (Hs)	m	5.4	3.2	5.1	5.3	5.0
Wave Period (Tp)	s	10 (Ts)	13.9 (Tp)	8.6 (Ts)	13.1	9.2 (Ts)
1 minute average wind speed	m/s	31.3	16.5	31.3	41.0	29.1
Surface current	m/s	1.5	0.7	2.1	1.8	1.4

- Broadwater YMS design in Long Island Sound is consistent with general design parameters in other locations worldwide, plus a significant additional safety margin (designed for Category 5 hurricane)
- Design to same standards on Atlantic side of Long Island likely to exceed limits of technical feasibility or will require reduced level of safety in design

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STL Buoy Minimum Water Depth

- Preferred minimum 60 meters (197 feet)
- Minimum depth is dependent on 1:100 yr wave conditions but APL suggest for an 8 -10 meter wave height 40 meters (131 feet) is a reasonable assumption
- APL are currently studying a minimum depth of 30 meters (98 feet)

SRV Regasification Capability

Name	In Service	Capacity (m3/LNG)	Regas Capacity (mmscf/d NG)	Odorization	Ownership	Comment
Excelsior	2005	138000	450 Closed Loop 690 Open Loop	No	Exmar	
Excellence	2005	138000	450 Closed Loop 690 Open Loop	No	GKFF	
Excelerate	2006	138000	450 Closed Loop 690 Open Loop	No	Exmar/Excelerate	
Explorer	2008	150900	600 Closed Loop 690 Open Loop	Yes	Exmar/Excelerate	
Express	2009	150900	600 Closed Loop 690 Open Loop	Yes	tbc	Excelerate fleet
tbc	2009	160000	tbc	Yes	tbc	Excelerate fleet
tbc	2009	160000	tbc	Yes	tbc	Excelerate fleet
tbc	2009	145000	500 Closed Loop	tbc	Heogh/MOL	Potential to operate at 750mmscf/d
tbc	2010	145000	500 Closed Loop	tbc	Heogh/MOL	Potential to operate at 750mmscf/d

- SRV fleet currently 3 ships – 9 ships by 2010
- Contrast with worldwide fleet of approximately 180 LNG carriers (many more under construction)
- SRV facilities limit the ability to take advantage of spot LNG cargoes and reduces flexibility in acquiring supply

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SRV – APL Buoy Technology

From: http://www.excelerateenergy.com/energy_bridge.php

APL's STL Buoy technology has been proven safe and effective through actual use since 1993 at locations around the world, including the harsh environment of the North Sea.

The STL Buoy is designed to be connected to vessels in harsh environments when seas are in excess of 5 meters in significant wave height. In addition, the system is capable of continued transfer operations when seas are in excess of 12 meters in significant wave height. Further, a buoy can be disconnected during normal operations in approximately one hour and safely in less than twenty minutes during emergencies.

- Stated performance above is for oil production systems, not for LNG
- LNG is a cryogenic fluid – very different containment system from oil systems

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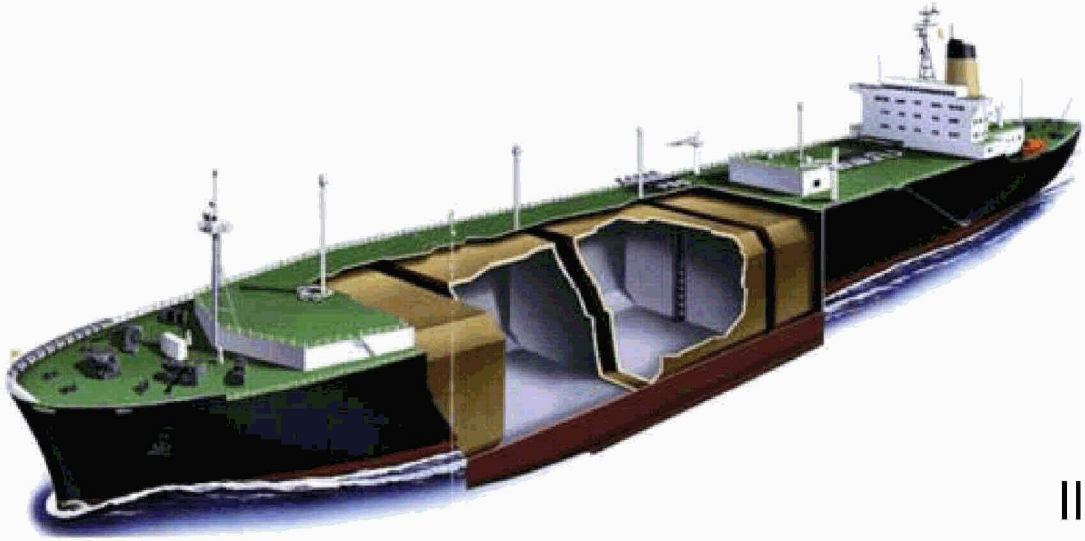
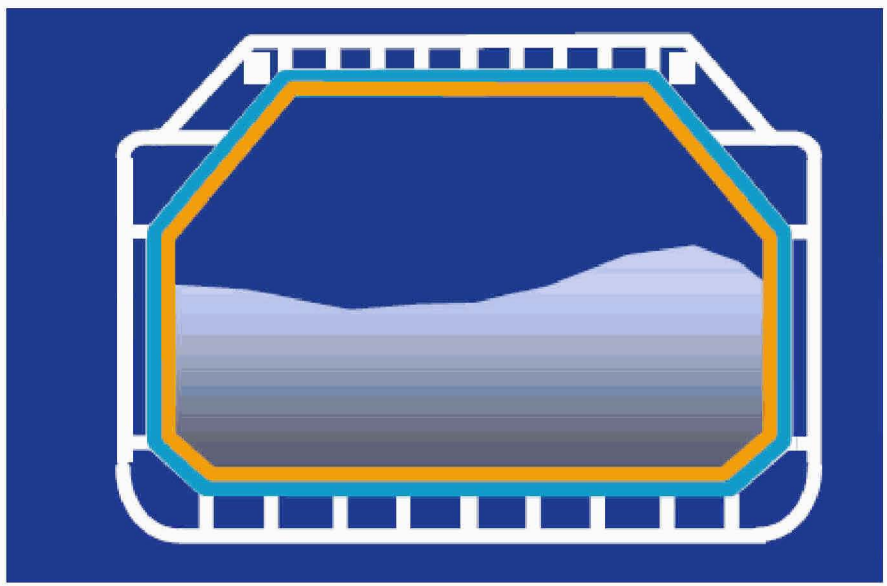
Sloshing Phenomena



Illustrative Cross Section



- Wave forces generated within the containment system due to external wave events have damaged cryogenic containment systems
- Has occurred in partially filled LNG carriers (typically full or empty during ocean voyages)
- Sloshing is problematic for SRV alternative as well as FSRU

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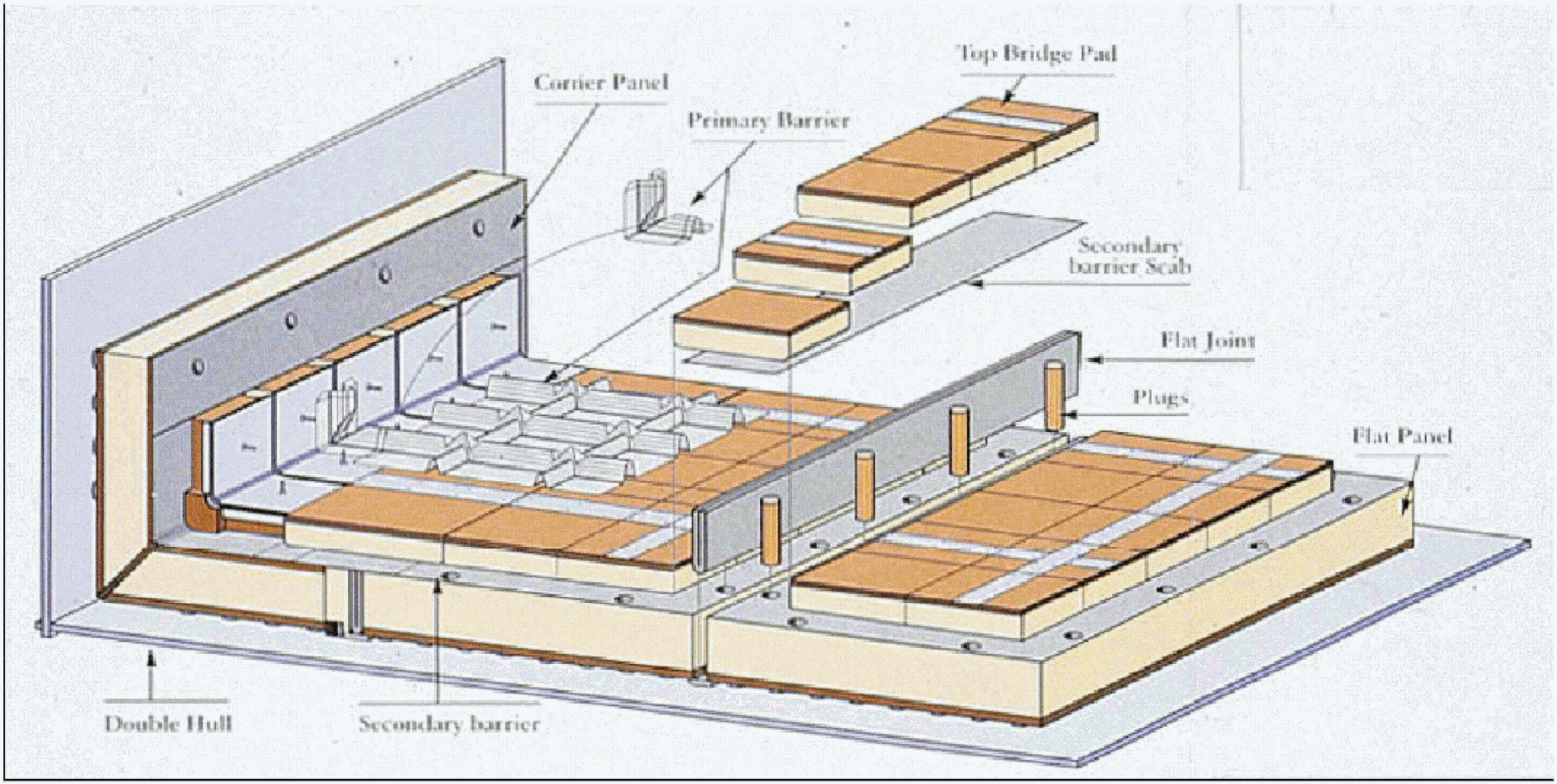
Membrane Tank Detail



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Combined FSRU/SRV Alternative

- FSRU alternative in Atlantic would pose unreasonable risks
  - Mooring system
  - Sloshing
- Economic considerations
  - Additional costs for system to provide same volume as FSRU in Long Island Sound
- Reliability considerations for SRV alternative
  - Ship availability

Summary – Atlantic Sites

- Reliability – wave conditions
  - Unacceptable risk of supply stockouts
  - Proven risk of damage to facility due to sloshing under extreme wave events
- Reliability – regas technology
  - SRV alternative would require multiple buoy system
  - SRV ship availability (specialized design vs. available fleet) impairs reliability
- Mooring system
  - Yoke Mooring System highly likely to be infeasible (extreme event design)
  - STL Buoy requires greater depth, therefore longer marine pipeline (and greater environmental impact)
- Ship collision risk unacceptable and much greater than Long Island Sound

Long Island Sound Operational Conditions (Projected)

Wave Height (m)	Wind Velocity (m/s) 0	5	10	15	20	25	30	Total
0 - 0.05	4.58%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	4.59%
0.05 - 0.15	8.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.79%
0.15 - 0.25	0.39%	7.42%	0.00%	0.00%	0.00%	0.00%	0.00%	7.81%
0.25 - 0.35	0.00%	41.33%	10.75%	0.31%	0.00%	0.00%	0.00%	52.39%
0.35 - 0.45	0.00%	2.12%	1.34%	0.18%	0.00%	0.00%	0.00%	3.65%
0.45 - 0.55	0.00%	1.49%	1.42%	0.19%	0.00%	0.00%	0.00%	3.10%
0.55 - 0.65	0.00%	1.14%	1.97%	0.18%	0.00%	0.00%	0.00%	3.30%
0.65 - 0.75	0.00%	0.15%	2.48%	0.21%	0.00%	0.00%	0.00%	2.84%
0.75 - 0.85	0.00%	0.02%	2.03%	0.28%	0.00%	0.00%	0.00%	2.33%
0.85 - 0.95	0.00%	0.00%	1.73%	0.38%	0.00%	0.00%	0.00%	2.12%
0.95 - 1.05	0.00%	0.00%	1.28%	0.49%	0.01%	0.00%	0.00%	1.78%
1.05 - 1.15	0.00%	0.00%	1.13%	0.50%	0.00%	0.00%	0.00%	1.63%
1.15 - 1.25	0.00%	0.00%	0.76%	0.49%	0.01%	0.00%	0.00%	1.26%
1.25 - 1.35	0.00%	0.00%	0.54%	0.56%	0.01%	0.00%	0.00%	1.11%
1.35 - 1.45	0.00%	0.00%	0.32%	0.56%	0.02%	0.00%	0.00%	0.89%
1.45 - 1.55	0.00%	0.00%	0.16%	0.54%	0.03%	0.00%	0.00%	0.73%
1.55 - 1.65	0.00%	0.00%	0.07%	0.44%	0.03%	0.00%	0.00%	0.53%
1.65 - 1.75	0.00%	0.00%	0.01%	0.27%	0.03%	0.00%	0.00%	0.31%
1.75 - 1.85	0.00%	0.00%	0.00%	0.19%	0.02%	0.00%	0.00%	0.21%
1.85 - 1.95	0.00%	0.00%	0.00%	0.13%	0.03%	0.00%	0.00%	0.16%
1.95 - 2.05	0.00%	0.00%	0.00%	0.07%	0.05%	0.00%	0.00%	0.12%
2.05 - 2.15	0.00%	0.00%	0.00%	0.05%	0.04%	0.00%	0.00%	0.09%
2.15 - 2.25	0.00%	0.00%	0.00%	0.02%	0.04%	0.00%	0.00%	0.07%
2.25 - 2.35	0.00%	0.00%	0.00%	0.01%	0.05%	0.00%	0.00%	0.06%
2.35 - 2.45	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.04%
2.45 - 2.55	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.02%
2.55 - 2.65	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.02%
2.65 - 2.75	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.01%
2.75 - 2.85	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.01%
2.85 - 2.95	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.01%
2.95 - 3.05	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%
3.05 - 3.15	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%
3.15 - 3.25	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%
3.25 - 3.35	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%
> 3.35	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	13.77%	53.69%	25.98%	6.06%	0.48%	0.05%	0.00%	100%

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Transco System Alternative

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Regional Pipeline Grid

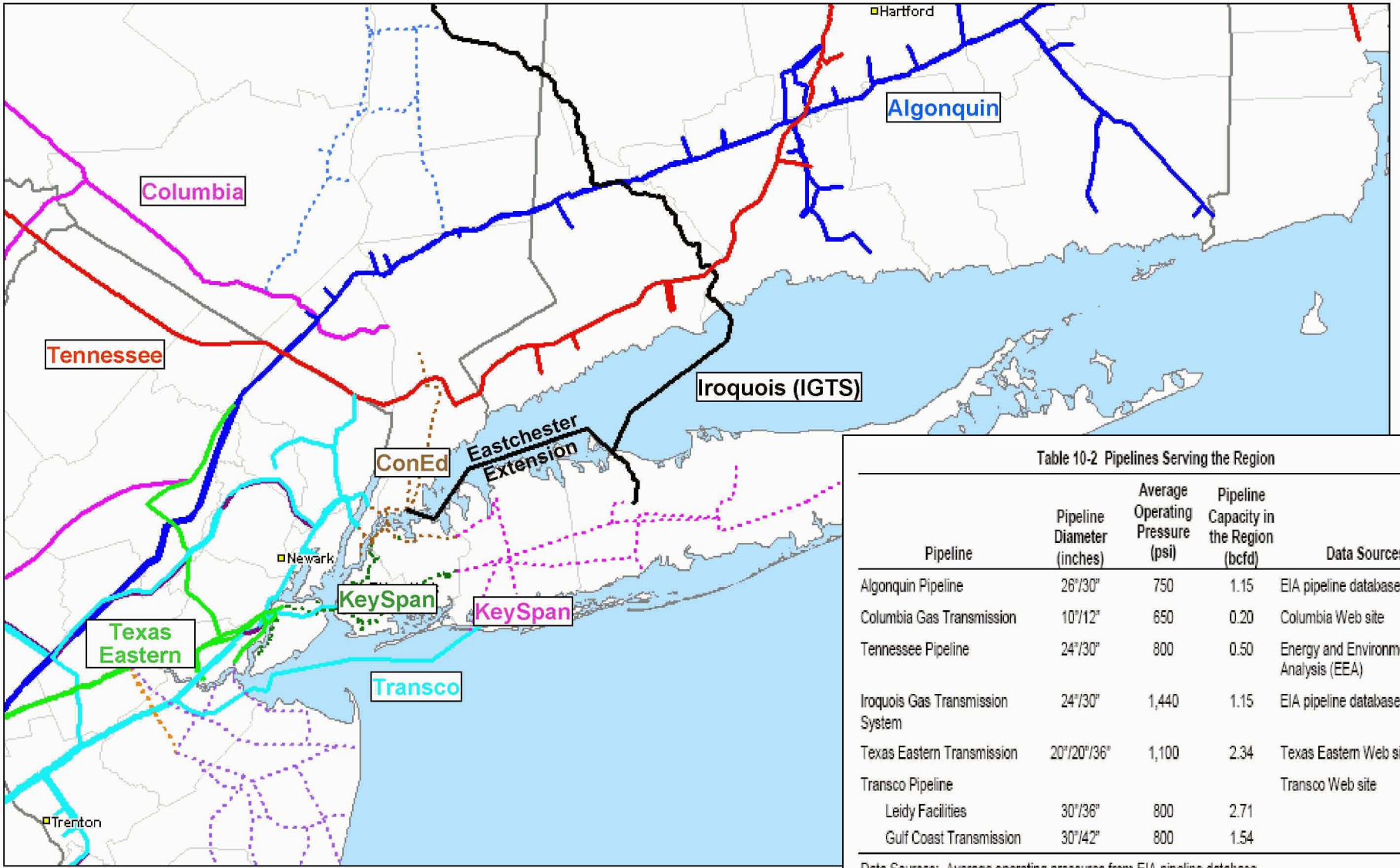

Table 10-2 Pipelines Serving the Region

Pipeline	Pipeline Diameter (inches)	Average Operating Pressure (psi)	Pipeline Capacity in the Region (bcfd)	Data Sources
Algonquin Pipeline	26"/30"	750	1.15	EIA pipeline database
Columbia Gas Transmission	10"/12"	650	0.20	Columbia Web site
Tennessee Pipeline	24"/30"	800	0.50	Energy and Environmental Analysis (EEA)
Iroquois Gas Transmission System	24"/30"	1,440	1.15	EIA pipeline database
Texas Eastern Transmission	20"/20"/36"	1,100	2.34	Texas Eastern Web site
Transco Pipeline				Transco Web site
Leidy Facilities	30"/36"	800	2.71	
Gulf Coast Transmission	30"/42"	800	1.54	

Data Sources: Average operating pressures from EIA pipeline database.

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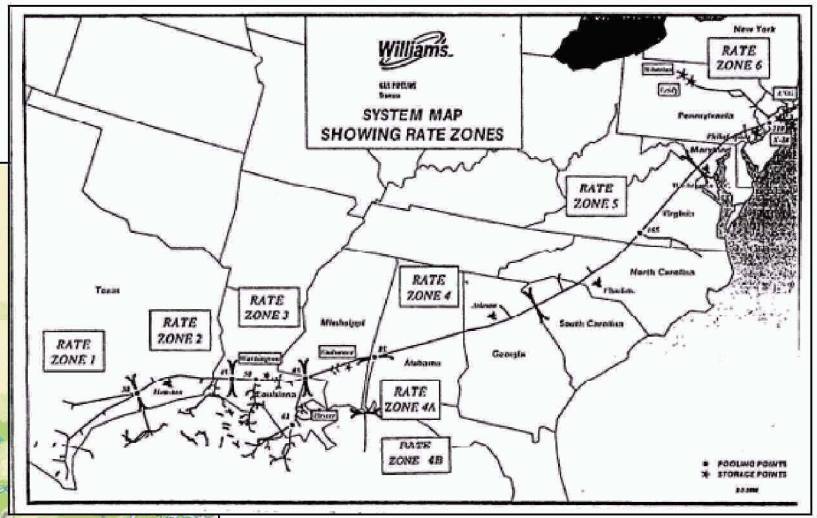
Williams' Transco Facilities

Williams' Transco pipeline system extends from South Texas and Western Pennsylvania to New York City. It transports gas from the Gulf Coast to 12 Southeast and Atlantic Seaboard states, including major metropolitan areas in NY, NJ and PA



System Design Capacity	8.1 billion cubic feet per day
Seasonal Storage	216 billion cubic feet
Supply Areas	Gulf Coast
Market Areas	Southeast, Mid-Atlantic, and Northeastern states
Miles of Pipeline:	10,560 miles
Compressor Stations	43

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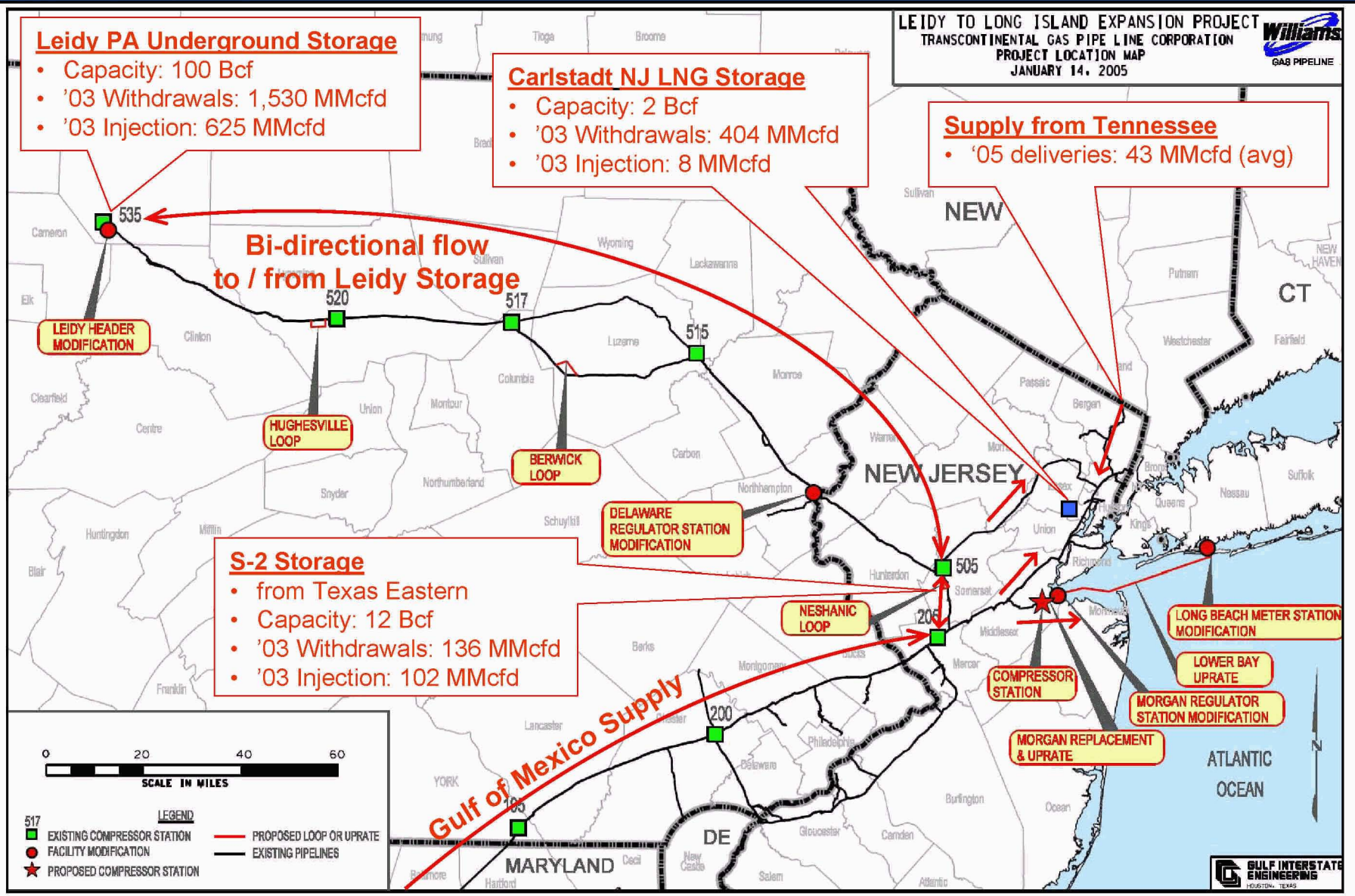
Transco's NJ & NY Market Area



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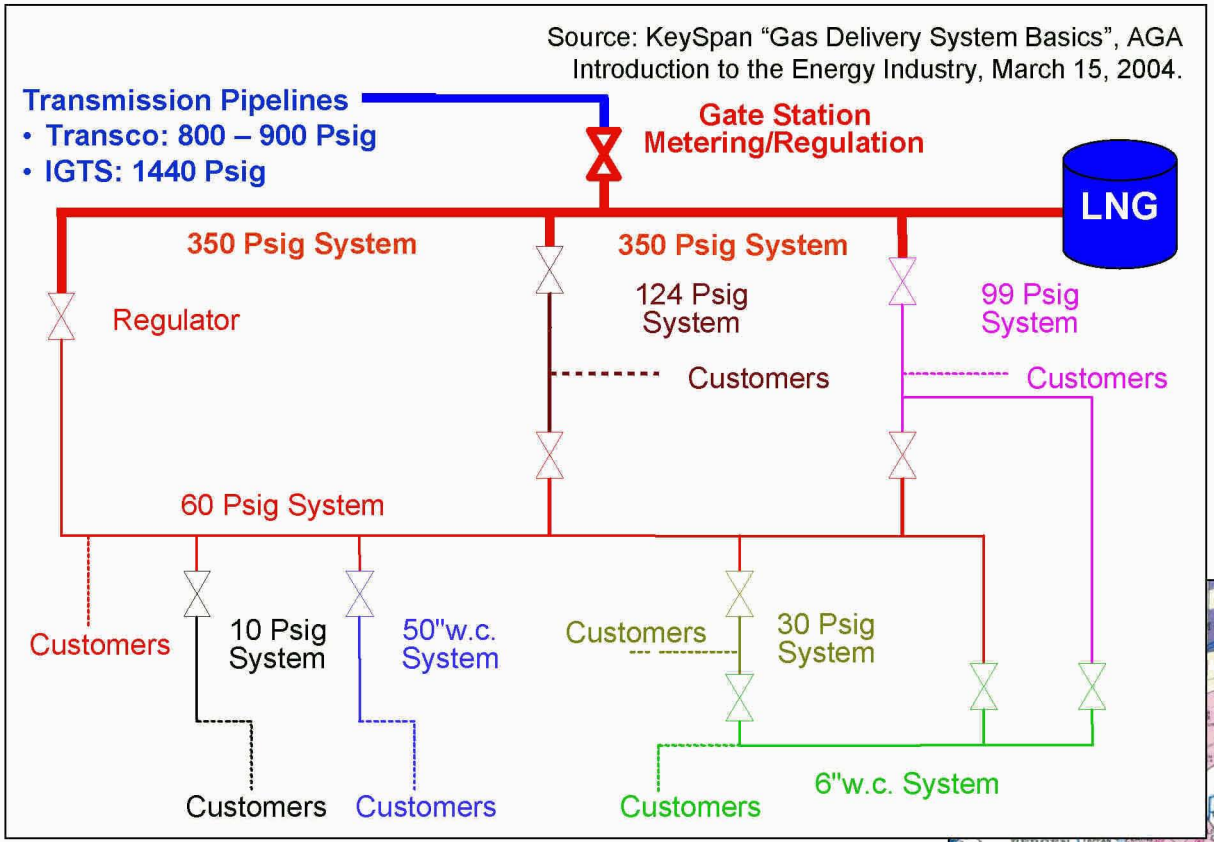
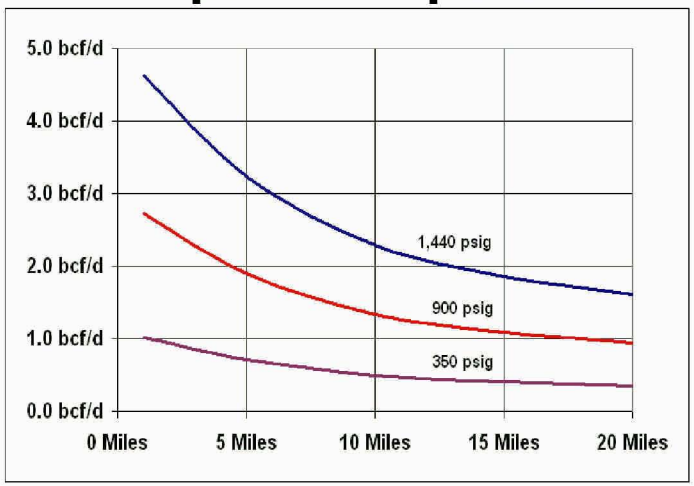
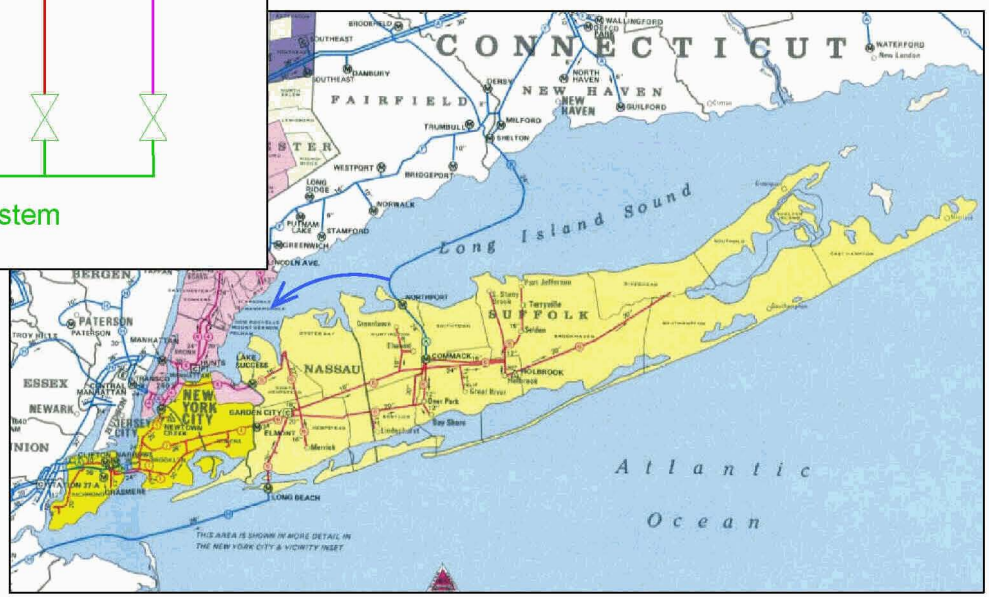
Gas Delivery Systems



24" Pipeline Capabilities





The capability of a 1,440 psig transmission pipeline is 70% greater than a 900 psig pipeline, and 360% greater than 350 psig LDC trunkline system for pipes of the same diameter

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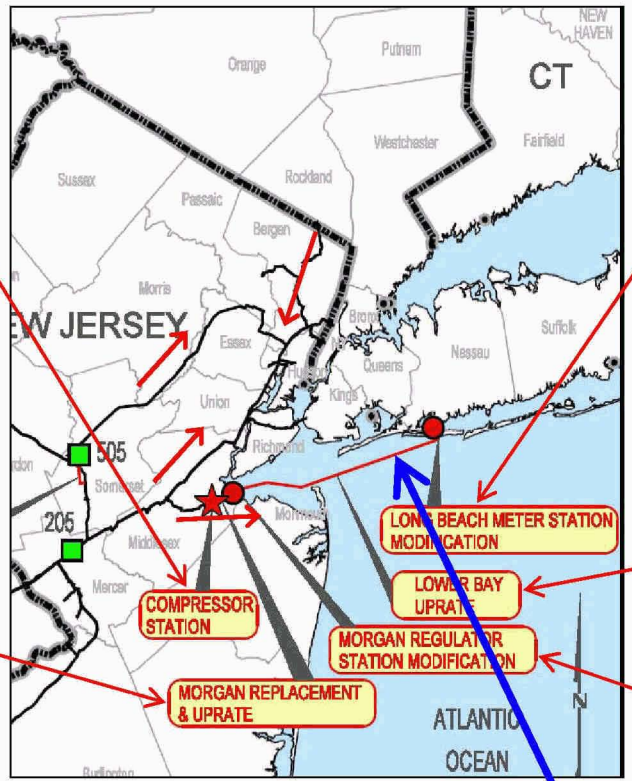
Transco Expansion Facilities Serving Long Island

Modifications in New Jersey and Long Island to increase throughput of the Lower Bay Extension from 600 MMcfd to 700 MMcfd (FERC Docket No. CP06-34-001)

Installation of two 5,000 HP electric motor-driven compressor units (10,000 total HP) at a new compressor station in Middlesex County, New Jersey (Compressor Station No. 207)

Replacement of approximately 2.45 miles of 42-inch pipeline and the uprating of approximately 3.53 miles of 42-inch pipeline between Mile Post 8.50 and Mile Post 12.03 on Transco's existing onshore portion of the Lower New York Bay Mainline "C" in Middlesex County, New Jersey



Modifications to Long Beach Meter Station in Nassau County, New York, including 3 new gas heaters originally addressed as nonjurisdictional facilities to be installed by KeySpan

Uprating of 33.66 miles of Transco's existing 26-inch Lower New York Bay Extension, from Mile Post 12.05 to Mile Post 45.71 from a MAOP of 800 psig to 960 psig

Modifications to Morgan Regulator Station in Middlesex County, New Jersey

A direct connect to the Transco Lower Bay Extension by the Broadwater send-out pipeline would cause up to 700 MMcfd to be displaced onto the Transco system in New Jersey depending on market pull at Long Beach. At a minimum, under utilization and/or re-piping of Transco's CP06-34-001 facilities would be needed, especially in the event of physical flow reversal on the Lower Bay Extension.

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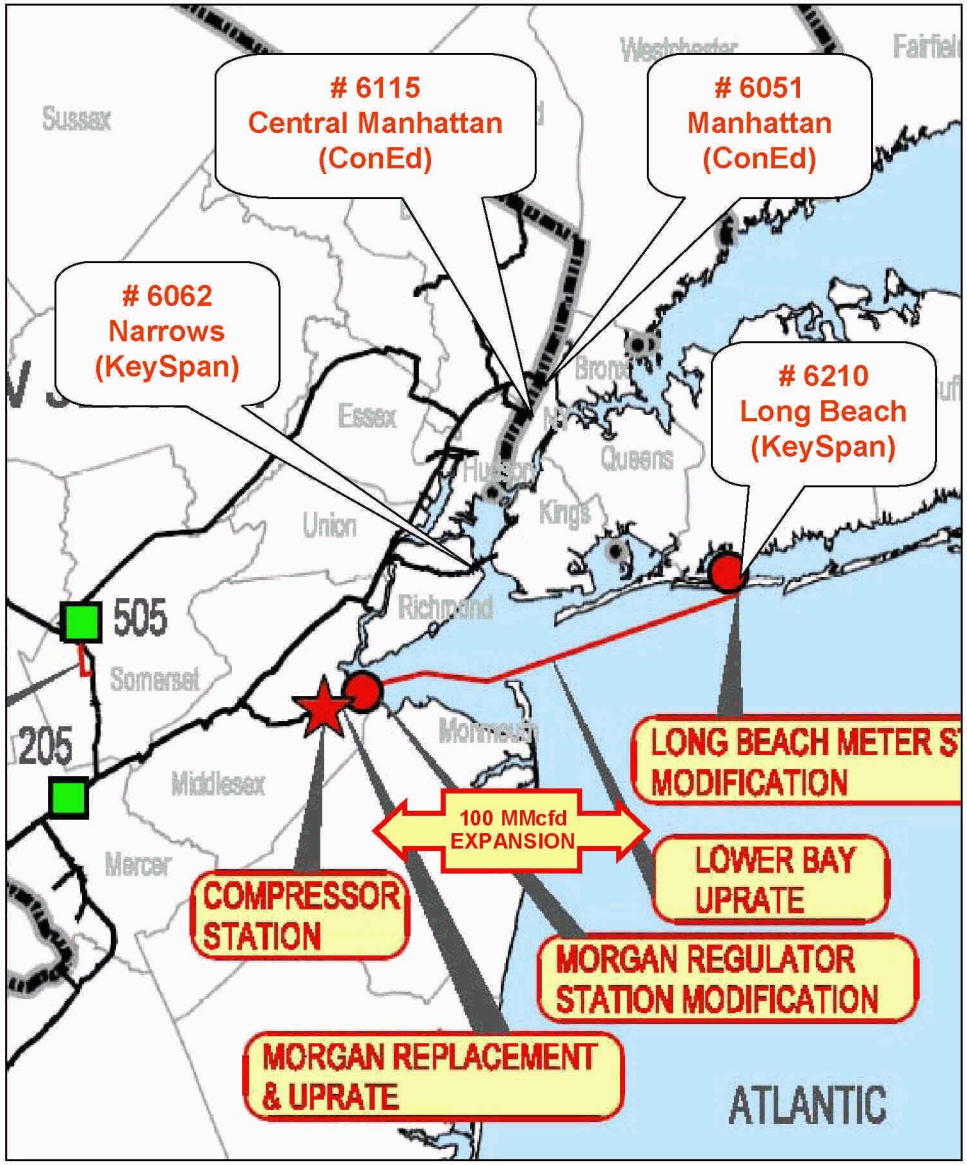
Transco Deliveries in the Region



Consider deliveries on the NYC side of Transco compressor stations 205 and 505 in New Jersey…

Delivery Meter Stations	No.	2005 Deliveries (MMcfd)	
		Average (Jan-05 – Dec-05)	Noncoincidental Peak (Apr-05 – Mar-06)
West of the Hudson (eastern N.J. and Staten Island)	44	500 (38%)	1,750
East of the Hudson (Manhattan and Long Islands)	4	820 (62%)	1,770
Total	48	1,320	3,520

- **Displacement volumes from Broadwater would need to be consumed in New Jersey, or points further west or south that currently access Gulf Coast gas supply (including existing and new LNG import terminals), or would need to be sent to storage.**
- **Accessing market growth east of the Hudson would be hindered by existing river crossing capacity and the inability of LDCs to move large volumes over long distances. Eastern L.I. and CT, in particular, could not be served efficiently from offshore Atlantic location.**
- **Connecting directly to Iroquois avoids these drawbacks**

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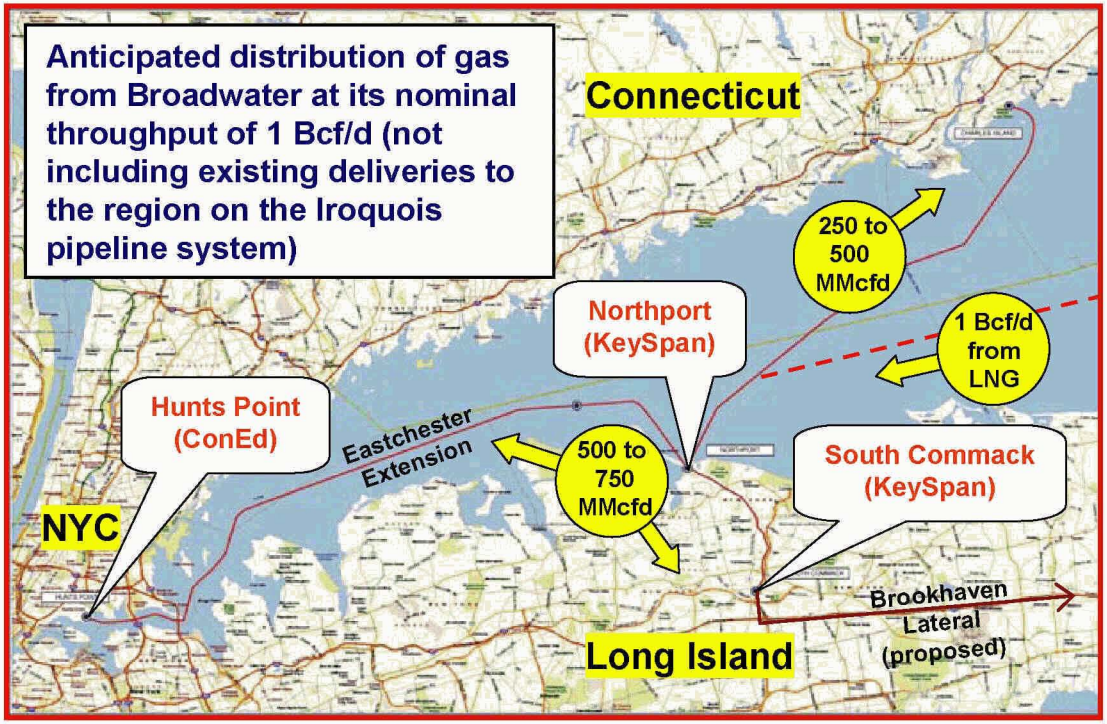
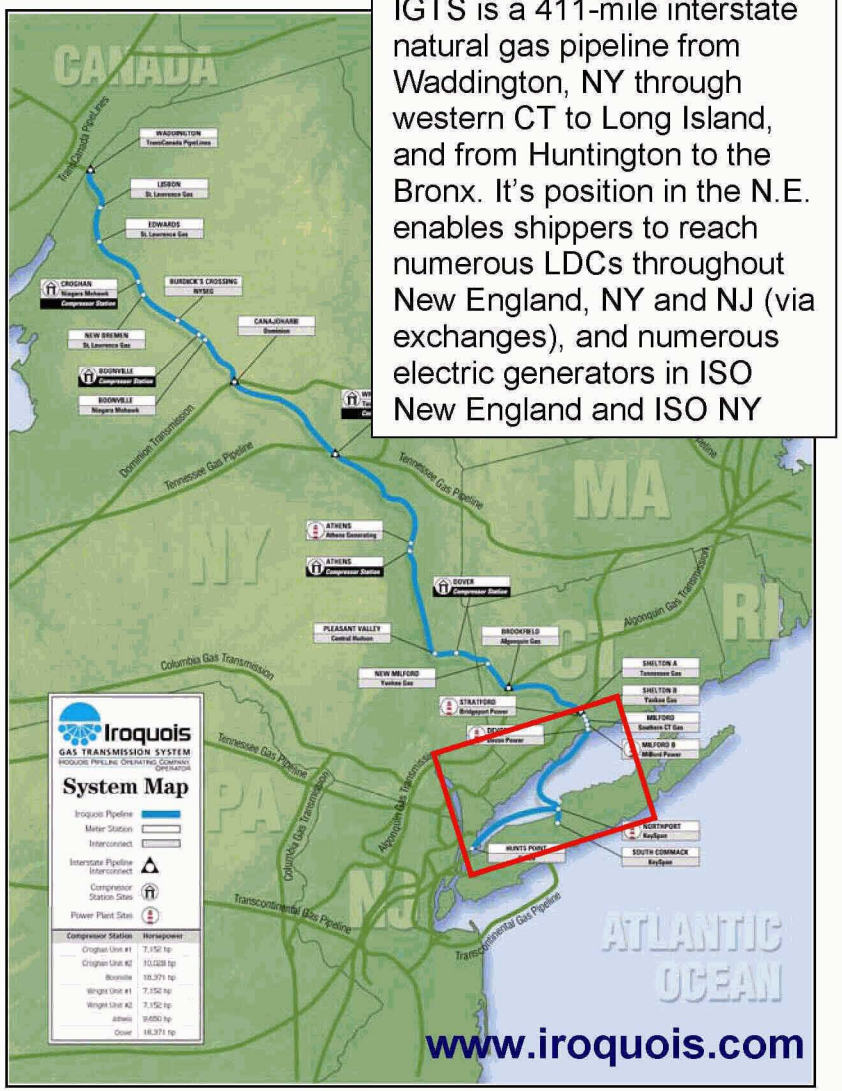
Regional Market Access via Iroquois



Delivery Meter Stations	No.	2005 Deliveries MMcfd	
		Average (Jan-05 – Dec-05)	Noncoincidental Peak (Apr-05 – Mar-06)
CT	8	300	530
Long Island	2	220	360
NYC	1	140	250
Total	11	660	1,140



IGTS is a 411-mile interstate natural gas pipeline from Waddington, NY through western CT to Long Island, and from Huntington to the Bronx. It's position in the N.E. enables shippers to reach numerous LDCs throughout New England, NY and NJ (via exchanges), and numerous electric generators in ISO New England and ISO NY

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Transco System - Conclusions

- Broadwater's target market is NYC, Long Island and Connecticut. A direct connect to Transco's Lower Bay Extension can effectively only serve markets in New Jersey and points further south.
- A direct connect to Transco's Lower Bay Extension cannot match Broadwater's deliverability to eastern Long Island and Connecticut
  - Only small, incremental capacity expansions of Transco's crossings of the Hudson are possible (see Leidy to Long Island expansion project)
  - LDC trunklines in the Region cannot match the throughput capacity and deliverability of transmission pipelines, especially 1,440 psig systems such as Iroquois
- A direct connect to Iroquois will efficiently serve NYC, eastern Long Island and Connecticut
  - Gulf Coast pipelines serving NYC and Long Island are confronted with significant impediments to expansion; IGTS is already there
  - Iroquois is positioned to best serve eastern Long Island and CT customers through existing and proposed high pressure pipelines and purpose built, high capacity gate stations that can be expanded to match demand

South Shore Atlantic Pipeline Route Alternatives

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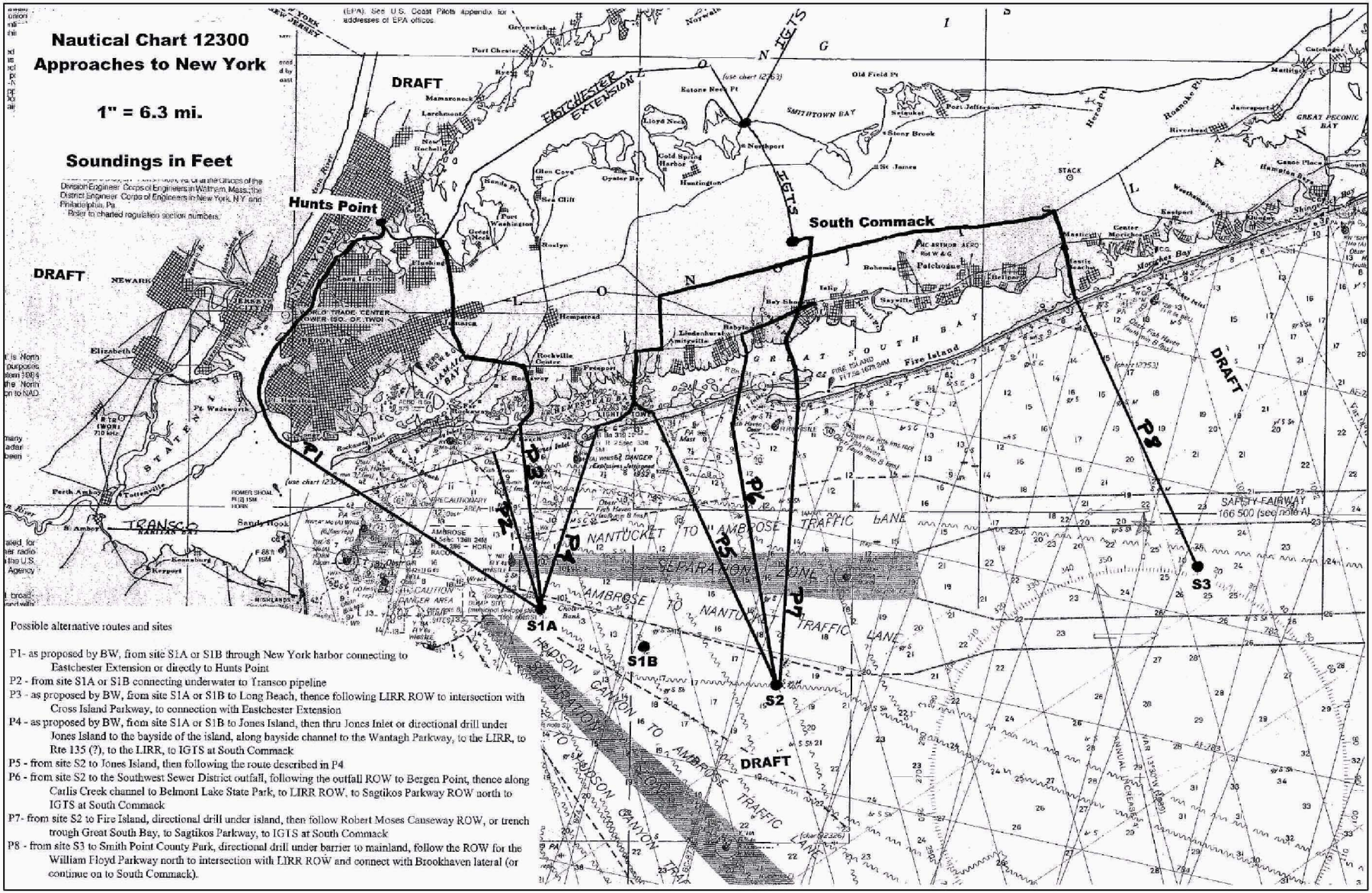
NYSDOS Alternative Terminal Sites and Pipeline Routes Issued 20-Apr-07



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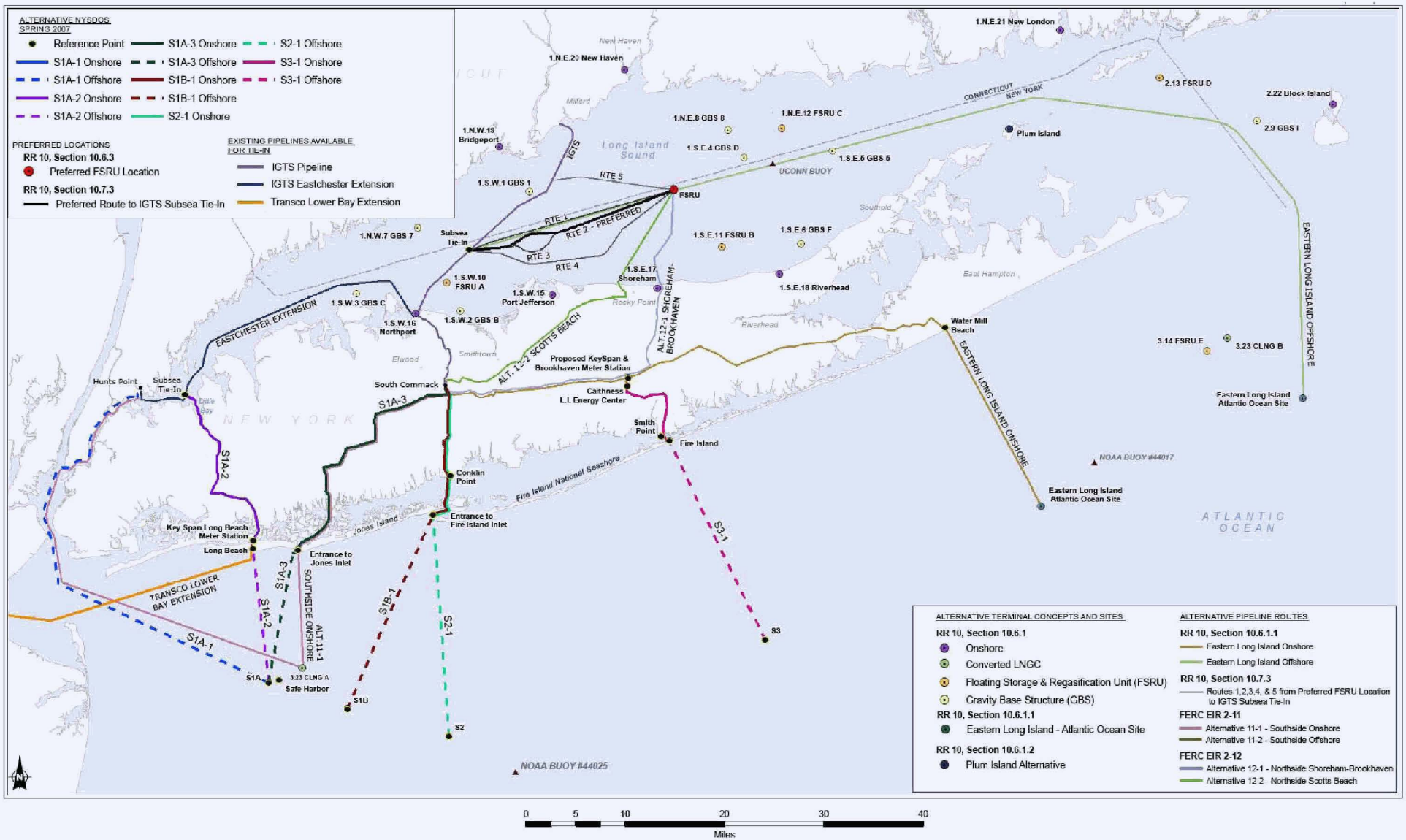
Alternative Terminal Sites and Pipeline Routes Considered by Broadwater



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Engineering Discriminators

Factor		Preferred	S1A-1	S1A-2	S1A-3	S1B-1	S2-1	S3-1
New Build Pipeline Length	miles	21.7	47.79	34.59	41.71	36.61	37.59	32.89
New Build Compressor Stations	site	0	Hunts Point	Little Neck	0	0	0	South Commack
Long Island Railroad Co-location (safety)	miles	0	0	8.26	3.09	1.49	1.49	0
Residences Adjacent to Construction ROW	no.	0	0	623	1,143	37	3	10
Major Shore Crossings	no.	0	1	6	3	3	3	3
Submarine Cable / Utility Crossings	no.	2	20	14	13	9	8	6
Navigation Channels Crossed	no.	0	16	6	3	3	4	3
Marine Obstructions within 1 Mile	no.	0	103	34	1	0	2	0
Roadways / Bridges / Tunnels Crossed	no.	0	7	27	28	15	15	6
Pipeline in Traffic Separation Areas / Shipping Fairways	miles	0	0	4.8	9.95	15.11	17.43	2.5

Environmental Discriminators

Factor		Preferred	S1A-1	S1A-2	S1A-3	S1B-1	S2-1	S3-1
Fisheries Use Areas Traversed	miles	0	34.38	7.23	8.74	8.85	9.15	3.66
Significant Critical Fish and Wildlife Habitat	miles	0	0	3.12	5.37	4.16	4.16	0.19
Submerged Aquatic Vegetation (inshore area)	miles	0	0	1.78	5.3	5.05	5.05	0.19
Tidal Wetland Crossings	no.	0	0	6	12	14	14	4
Contaminated Sediments	type	Not present based on site-specific data	Heavy Metals & PCBs	unknown	unknown	unknown	unknown	unknown
Wrecks within 1 Mile	no.	9	153	43	3	0	3	0
Federal and Local Park Land Impacts	miles	0	0	0.06 (Long Beach Park)	0.52 (Jones Beach, Wantagh, Milpond Parks)	0.15 (Gilgo, Captree Parks	0.15 (Gilgo, Captree Parks)	1.47 (Fire Island National Seashore)

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South Shore Atlantic Pipeline Alternatives
Major Impediments to Feasibility

- Significant impacts to onshore/shoreline resources in the coastal zone
- Construction of multiple crossing types (i.e. wetlands, bridges, highways, cables, utilities), constrained workspaces, unknown underground obstructions, safety issues adjacent to roadway and railway corridors, and residential properties
- Excessive pipeline lengths compared to the Preferred Route; need for new-build onshore compressor stations for some alternatives
- Presence of numerous marine obstructions and wrecks compared to the Preferred Route
- Installation at deeper depths of cover in navigation channels resulting in greater disturbance and increased sedimentation, need for sediment disposal and increased unit installation costs and duration

Broadwater Energy

Third Technical Data Meeting

Meeting with New York Department of State Coastal Resources Division

May 23, 2007
Albany, New York

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Agenda

- Follow-up Items – May 2nd meeting
- Atlantic Alternatives
- Long Island Sound Preferred Alternative
  - Coastal Zone Review Process (including 15 CFR § 930.56 and 15 CFR 930.62(d))
- Mitigation, Offsets and Enhancements?
- Emergency Response Plan
- NYSDOS Additional Questions
- Next Steps

Follow-up Items – May 2nd Meeting

- APL STL buoy – appropriate water depth
- Coast Guard – collision risk in Atlantic locations
- Battelle report – page 8 interpretation
- Visual impact assessment
- Brookhaven Lateral – discussed in Atlantic Alternatives material

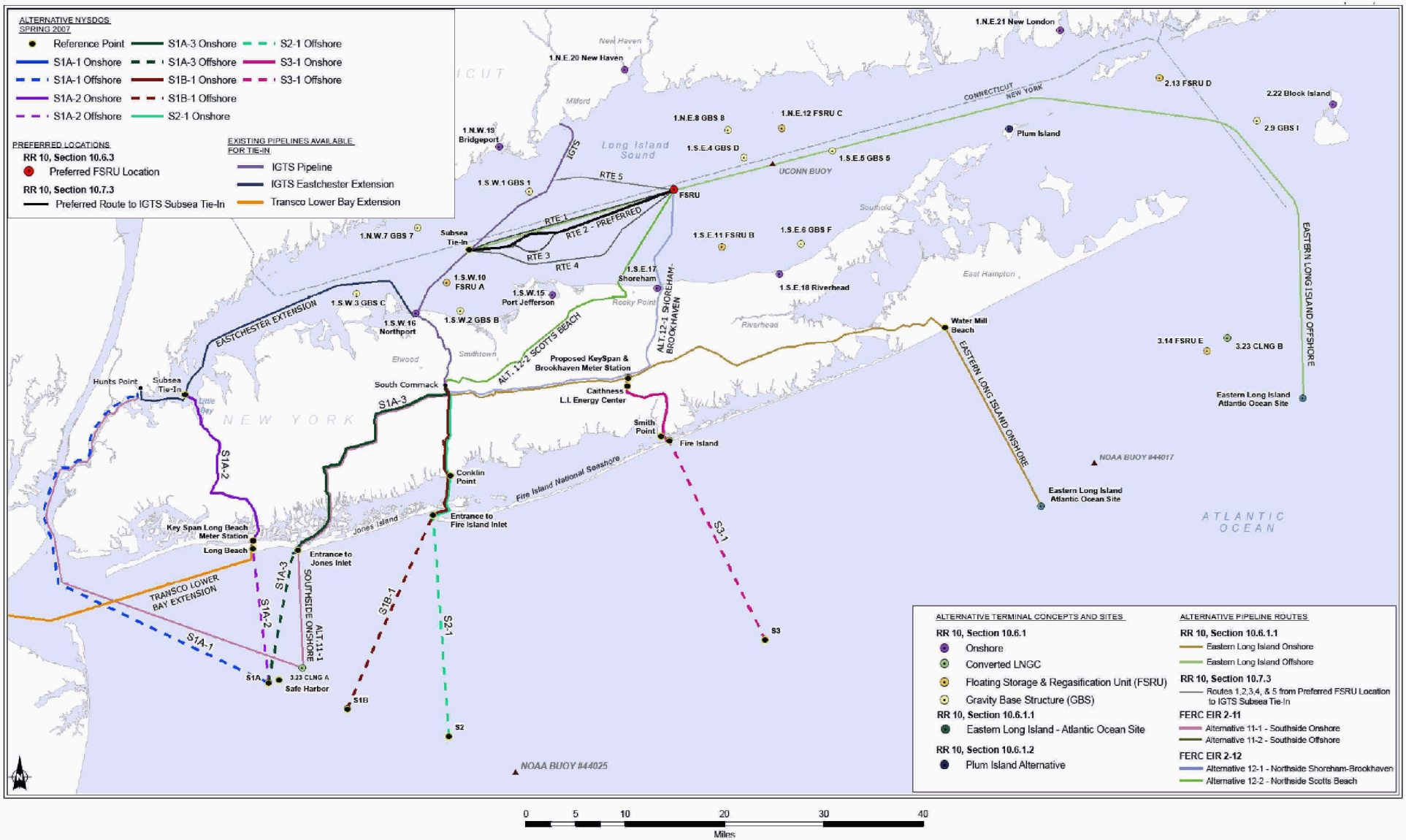
Visual Impact Assessment – Follow-up

- *"Aesthetic impact occurs when there is a detrimental effect on the perceived beauty of a place or structure. Significant aesthetic impacts are those that may cause a diminishment of the public enjoyment and appreciation of an inventoried resource, or one that impairs the character or quality of such a place. Proposed large facilities by themselves should not be a trigger for a declaration of significance. Instead, a project by virtue of its siting in visual proximity to an inventoried resource may lead staff to conclude that there may be a significant impact."* (NYSDEC Visual Policy)
- Based on this definition, it is reasonable to conclude that visibility of the proposed LNG terminal (albeit a large facility), does not result in a detrimental effect on the perceived beauty of any place or structure; nor will the project cause the diminishment of public enjoyment and appreciation of an inventoried resource, or impair the character or quality of such a place.
- This information was presented in Appendix K of the Visual Resource Assessment pages 59-60 dated December 5, 2005 submitted as part of the Coastal Zone Consistency Determination (April 2006) as well as Appendix D of Resource Report 8 submitted January 2006.

ACOE Visual Resource Assessment Procedure

- ACOE Visual Resource Assessment Procedure (VRAP) is not an ACOE Policy
  - Visual assessment methodology that was commissioned as an exercise by ACOE in the 1980's to see if visual impact could be quantified
- To our understanding, VRAP has never been formally adopted or accepted as standard ACOE operating procedure or used by ACOE since initial introduction
- To our understanding, methodology has never been peer reviewed or accepted as an industry standard
- Broadwater approach consistent with approach used in other coastal zone matters

Alternative Terminal Sites and Pipeline Routes Considered by Broadwater



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Brookhaven Lateral (1)

- October 19, 2006 – LIPA announces plans to alter project routing from LIPA rights-of-way; revisiting previous plan along Long Island Expressway (see handout)
- October 24, 2006 – letter from NYSDOT to FERC (see handout)
  - Only utilities permitted to longitudinally occupy NYS freeway ROWs are communication utility facilities
  - Requests for non-highway use of controlled access highways (such as gas pipeline) are exceptions to NYSDOT's accommodation plan
  - NYSDOT has a procedure for exception requests

Brookhaven Lateral (2)

- October 24, 2006 – letter from NYSDOT to FERC
  - Federal Highways Act (FHWA) and NYSDOT require a SEQRA and FHWA regulations-based NEPA review for each and every feasible alternative. All alternatives must be exhausted before FHWA approval of an exception can be granted.
  - ***To date, only one project has been granted an exception by FHWA. (emphasis added)***
  - NYSDOT must ensure compliance with federal laws, regulations and requirements. Failure to comply will result in a sanction issued by FHWA, and could result in … becoming ineligible for any federal-aid funding.

Route S3-1 – Horizontal Directional Drilling Issues

- 3 major shore crossings identified; 6 cable/utility crossings
- Fire Island National Park
- FERC application contingency fallback plan if unable to HDD may require moving off route centerline and retry until successful since open cut trench may not be acceptable. Could result in significant impacts on adjacent locations.
- HDD operations require 24 hours installation activity which will create nearshore noise, lighting and visual impact to surrounding communities
- Depending on offshore bottom topography, may need to dredge out sufficient soils to allow near shore access of HDD marine support spread
- Potential need to construct a pad on which to place equipment – environmental consequences. Sufficient onshore land is needed to support HDD operations.
- Potential impact of encountering unknown archeological sites or significant below ground obstructions

Summary – Atlantic Sites (1)

- Reliability – wave conditions
  - Unacceptable risk of supply stockouts due to inability to berth/unberth
  - Proven risk of damage to facility due to sloshing under extreme wave events
- Reliability – regas technology
  - SRV alternative would require multiple buoy system
  - Limited SRV ship availability (specialized ship design vs. available LNC carrier fleet) impairs reliability
- Mooring system
  - Yoke Mooring System highly likely to be infeasible (extreme event design)
  - STL Buoy requires greater depth, therefore longer marine pipeline (and greater environmental impact); greater depth implies more difficult wave conditions
- Ship collision risk unacceptable and much greater than Long Island Sound

Summary – Atlantic Sites (2)

- NYSDOT policy strongly discourages locating gas pipelines along highway system, making cross-island connections to Iroquois infeasible
  - *Accommodation of Non-Communication Utilities on NYS Freeway or Controlled Access ROWs*
- Horizontal directional drilling and HDD contingency plans may be unacceptable in areas adjoining national/state parks
- Support base considerations are made more difficult for easterly Atlantic locations
  - Further travel distances for support facilities (tugs, supply boats, etc.)
- Technical review process has shown parity in information – new data has not been uncovered which would change Broadwater's conclusions about Atlantic feasibility

Long Island Sound - Preferred Alternative (Broadwater)

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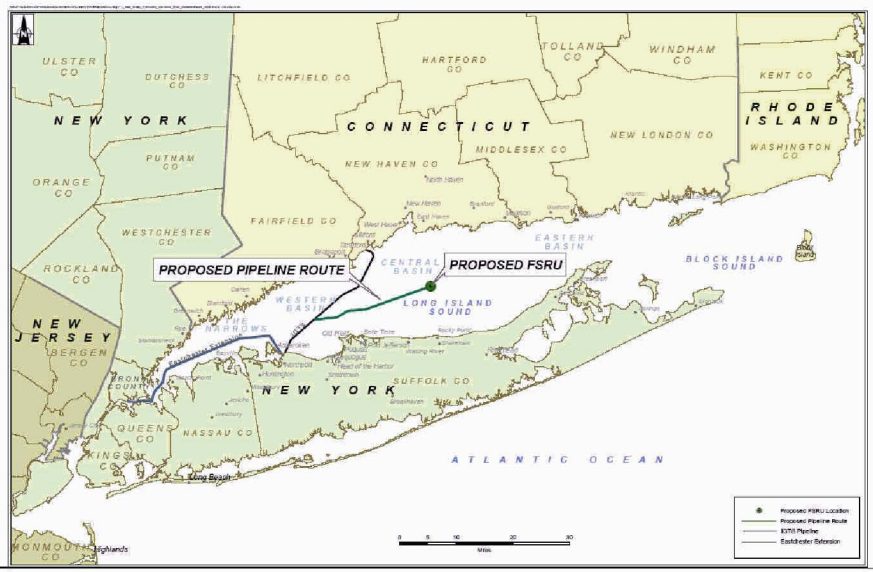
Project Overview

- Floating Storage Regasification Unit (FSRU) moored in the middle of Long Island Sound
- 22 mile undersea pipeline connecting to the existing Iroquois Gas Transmission System
- Storage of ~ 8 bcf of natural gas (350,000 m^3 of LNG) and send out capacity of 1 bcf/d (peak day 1.25 bcf/d)



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Coastal Zone Policy Discussion

- NYSDOS to identify enforceable policies (15 CFR § 930.56)
- Consultation with NYSDOS to agree on conditions, which if met by the applicant, would permit State agency concurrence (15 CFR 930.62 (d))

Long Island Sound - Issues (1)
Induced Coastal Effects - Broadwater

- FERC analysis of induced effects (DEIS pg 3-86)
  - Secondary activity, economic clustering, etc.
  - FERC did not identify this as a major issue

- Assessment of secondary or growth-inducing coastal impacts caused by the project
  - Which impacts are of the most concern?
  - Specific examples?
  - Potential options to mitigate or offset these effects?

Long Island Sound - Issues (2)
Community Character – LIS Coastal Policies

Working Coast Policies

Policy 13 - Promote appropriate use and development of energy and mineral resources

Policy 13.4 - Minimize adverse impacts from fuel storage facilities

- Regional petroleum reserve facilities are inappropriate in the Long Island Sound coastal area.
- The production, storage, or retention of petroleum products in earthen reservoirs is prohibited.
- **Liquefied Natural Gas facilities must be safely sited and operated.**
- Protect natural resources by preparing and complying with an approved oil spill contingency plan.

Mitigation – Water Quality/Biological

- Location in Long Island Sound away from nearshore and sensitive onshore habitats
- State of the art waste water treatment facilities
- Reduced inlet water velocities for all intakes
- Intakes position in middle of water column to minimize impacts to ichthyoplankton
- Subsea tie-in to avoid pipeline shore crossing
- Adherence to state water quality discharge limitations

Mitigation – Visual Impact

- Siting facility in widest portion of Long Island Sound
- 9 miles from nearest vantage point
- Final color choice to minimize contract with surrounding environment
- Minimize visibility from inland vantage points
- Potential displacement of commercial vessel transits carrying petroleum products (oil and derivatives) resulting in reduced pollution risk to coastal areas
- Northville terminal and other industrial facilities with greater visibility are currently in operation
- Ongoing impacts associated with passing tankers and coal carriers

Mitigation – Recreational/Commercial Uses

- Nearshore construction and operations impacts avoided
- Summer 2005 boat survey (Appendix I)
  - 9 survey days
  - 2 commercial lobster boats within 0.6 mile
  - 3 large commercial barges within 1 mile
  - 1 sailing regatta
  - Approx 2 recreational boats within 0.6 miles per survey hour

Offsets – Potential Examples

Coastline Enhancement

- Offshore habitat restoration
- Submerged aquatic vegetation
- Onshore habitat restoration – Long Island Sound Study

Visual Enhancement

- Creation or improvement of onshore viewing areas or viewshed
- Coastal building demolition or rehabilitation

Long Island Sound Issues
Emergency Response Plan – Development Process

Table of Contents

1. Strategic Approach for the ERP Development Process ("ERPDP")
2. Phase I – Data Gathering and Submission of ERPDP to the U.S. Coast Guard
3. Phase II – Emergency Response Community Meetings ("ERCM")
4. Phase III – Area ERP Working Committee ("AEWC")
5. Phase IV – Compiling the Emergency Response Plan

Strategic Approach For The ERP Development Process

An effective emergency response plan ("ERP") is a key part of the safe and secure operation of the proposed Broadwater facility. Broadwater is pleased to submit this plan outlining its draft ERP Development Process, as required by the U.S. Coast Guard's Waterways Suitability Report. This plan sets forth a **systematic approach** to the consultation of the many relevant stakeholders, as well as an organization and timeline for the phases of the ERP process.

Broadwater's central goal for the ERPDP is to present an **appropriate, effective plan** for developing the ERP. This plan demonstrates Broadwater's commitment to coordinate the ERP process by means of an **inclusive, collaborative, and transparent strategy**.

Broadwater is committed to ensuring that all relevant stakeholders' views are taken into account. While Broadwater will be effectively **self-sufficient** as regards emergency response to events on the proposed facility, public officials on both sides of the sound must be included in this process. The ERPDP includes consultation and cooperation with emergency response stakeholders in New York State, Connecticut, and Rhode Island, as well as on the federal level, including the U.S. Coast Guard and the Federal Energy Regulatory Commission.

Broadwater's ERP team consists of experts from Shell and TransCanada, as well as key emergency response advisors from Giuliani Partners LLC, SeaSecure LLC, and Det Norske Veritas.

Next Steps

- Additional NYSDOS questions/concerns?
- Further data exchange?
- Process for moving forward

Broadwater Energy

Fourth Technical Data Meeting

Meeting with New York Department of State Coastal Resources Division

June 13, 2007
Albany, New York

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Agenda

- DOS Follow-up Items
  - Copy of Battelle contract (done)
  - List of enforceable/applicable policies from LISCMP and LWRPs
- Broadwater Follow-up Items
  - Confidentiality letter
  - Issues with retrofitting LNG carrier as an SRV
  - Info on LNG fleet sizes, capacities, future construction
  - Market demand projections
  - Impacts of new supply on markets
  - Proximity to other industrial facilities
  - Visual comparison of vessel sizes
  - Areas of concern
    - Minimizing impacts
    - Offsets of remaining impacts
  - Additions of safety equipment, general safety/security discussion

SRV Retrofit Option (1)

- Membrane type LNG carrier required – deck space considerations, process safety considerations
- Modification required to ship hull to accommodate STL buoy system – major change
- Potential loss of ship fuel storage at front of LNG carrier
- Existing ships not designed for sloshing - require strengthened insulation boxes –
- Source of heat to regasify the LNG – ship's boilers not designed for this additional heating duty (closed loop system)
- Retrofit of existing LNG carrier not practical alternative

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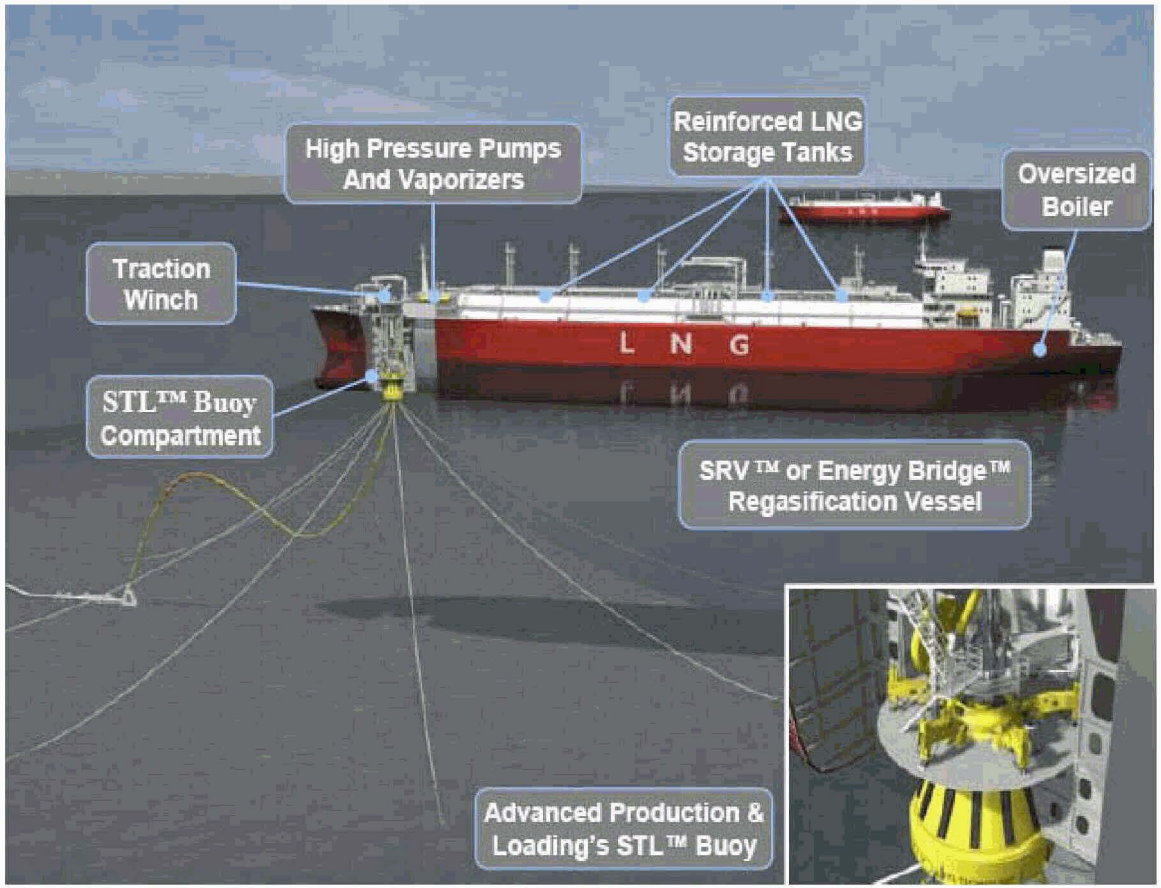
SRV Retrofit Option (2)



- Requirements:
  - Cylindrical trunk forward of LNG tanks to accommodate STL buoy and swivel system
  - Regasification units on deck
  - Supplemental electrical power
  - Pumps and piping for seawater cooling or other hearing medium
- Purpose-built ships clearly preferred option
- Conversions proposed for LNG carriers to FSRU, not SRVs
  - Golar Freeze – Livorno, Italy

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Future LNG Fleet Sizes and Capacities

- Maritime Business Strategies maintains a website of the LNG carrier order book (tab – Gas Carrier Construction)
- http://www.coltoncompany.com/shipbldg/worldsbldg/gas/lngorderbook.htm
- Relatively few large capacity LNG carriers on order – for worldwide trade
- Deliveries for 2010 and beyond

Northeast Market Demand Analysis

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Northeast Market Demand Analysis
Downstate NY LDCs

Projected Base Case Design Day Demand (MDt/d)

	Winter 2005 2006	Winter 2006 2007	Winter 2007 2008	Winter 2008 2009	Winter 2009 2010	Winter 2010 2011	Winter 2011 2012	Winter 2012 2013	Winter 2013 2014	Winter 2014 2015	CAGR
New York											
Central Hudson	124	125	127	129	131	132	133	134	136	137	1.12%
Consolidated Edison	1,016	1,034	1,052	1,071	1,090	1,098	1,106	1,114	1,122	1,130	1.19%
KeySpan – Long Island	963	994	1,027	1,060	1,095	1,131	1,168	1,206	1,246	1,287	3.28%
KeySpan – New York	1,193	1,204	1,214	1,225	1,236	1,247	1,258	1,269	1,280	1,291	0.88%
Orange & Rockland	222	224	226	228	230	232	234	236	238	241	0.90%
Total Design Day Demand	3,518	3,581	3,646	3,713	3,782	3,840	3,899	3,959	4,022	4,086	1.68%
Incremental Design Day Demand		64	129	196	264	322	381	442	504	567	
% Demand Met by Pipe/Storage	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	
Pipe/Storage Demand	2,814	2,865	2,917	2,971	3,026	3,072	3,119	3,167	3,218	3,269	
Incremental Pipe/Storage Demand		**51**	**103**	**157**	**211**	**257**	**305**	**353**	**403**	**454**	

Highlights

- **KeySpan - LI - Currently has a 36% saturation rate (commercial saturation rate of 60%)**
  - **Aggressive oil-to-gas conversion campaign**
  - **Significant opportunities for additional "close to the main" demand growth**

- **Con Edison - Growth driven recently by housing permits for new dwelling units**

KeySpan - LI is projected to surpass Con Edison and be tied for first with KeySpan NY as the largest downstate LDC in terms of design day demand

Data Source: Iroquois Gas Transmission

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Northeast Market Demand Analysis
Southern New England LDCs

Projected Base Case Design Day Demand (MDt/d)

	Winter 2005 2006	Winter 2006 2007	Winter 2007 2008	Winter 2008 2009	Winter 2009 2010	Winter 2010 2011	Winter 2011 2012	Winter 2012 2013	Winter 2013 2014	Winter 2014 2015	CAGR
Massachusetts											
Bay State Gas	430	436	443	449	456	463	469	476	483	490	1.46%
Berkshire Gas	56	56	57	58	58	59	60	60	61	62	1.08%
KeySpan - NE	1,270	1,300	1,340	1,359	1,384	1,414	1,445	1,476	1,508	1,541	2.17%
NSTAR	431	437	442	447	451	456	461	467	472	477	1.14%
Subtotal	2,187	2,229	2,282	2,313	2,349	2,392	2,435	2,479	2,524	2,570	1.81%
Connecticut											
Connecticut Natural Gas	274	277	280	283	285	288	291	294	297	300	1.00%
Southern Connecticut Gas	248	250	253	255	258	200	263	266	268	271	1.00%
Yankee Gas	324	333	339	349	353	357	360	364	368	371	1.51%
Subtotal	846	860	872	887	896	905	914	924	933	942	1.20%
Total Design Day Demand	3,033	3,089	3,154	3,200	3,245	3,297	3,349	3,403	3,457	3,512	
Incremental Design day Demand		57	120	166	212	264	316	369	424	479	
% Demand Met by Pipe/Storage	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	
Pipeline/Storage Demand	2,426	2,471	2,523	2,560	2,597	2,638	2,679	2,722	2,766	2,810	
Incremental Pipe/Storage Demand		45	96	133	170	211	253	295	339	383	

Highlights

- **KeySpan - NE -** **Currently has 52% saturation rate (commercial saturation rate of 60%)**
  - Aggressive oil-to-gas conversion campaign

Data Source: Iroquois Gas Transmission

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Northeast Market Demand Analysis
Incremental Generation: NYC/LI/NYCA

MW

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Projected Non-Peaking Generation Additions (62% of all additions)										
NYC	0	618	618	723	800	970	1,070	1,108	1,173	1,238
LI	0	0	216	216	216	216	216	216	216	216
NYCA	0	0	0	0	0	172	415	642	950	1,228
Total	0	618	1,451	2,390	2,468	2,809	3,152	3,416	3,790	4,134
Projected Peak Natural gas Usage (MDt/d)										
NYC	0	111	111	130	144	175	193	199	211	223
LI	0	0	39	39	39	39	39	39	39	39
NYCA	0	0	0	0	0	31	75	115	171	221
Total	0	0	150	169	183	244	306	354	421	483

Assumptions

- NYISO in-city generation requirement of 80%
- NYISO on-island generation requirement of 99%
- NYCA capacity reserve margin of 18%
- NYC Incremental Capacity
  - East River (288 MW) 2005
  - NYPA Poletti (500 MW) 2006
  - SCS Astoria Energy (500 MW) 2006
- LI Incremental Capacity
  - Caithness (277 MW) 2008
  - Neptune Transmission (660 MW) 2007

NYC Retirements

- Waterside (167 MW) 2005
- Poletti 1 (885 MW) 2008
- Astoria 2 (175 MW) 2010
- Astoria 3 (361 MW) 2012

Data Source: Iroquois Gas Transmission

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Northeast Market Demand Analysis
Incremental Generation: New England

MW

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Projected Non-Peaking Gen. Addition (62% of all additions)	0	0	0	24	299	592	930	1,243	1,484	1,717
Projected Peak Natural Gas Usage (MDt/d)	0	0	0	4	54	107	167	224	267	309

Assumptions

- CT CAGR = 1.9%, MA CAGR = 1.3%
- Reserve margin = 10%
- Incremental demand met entirely by generation (no new transmission to access power in neighboring control areas)

Data Source: Iroquois Gas Transmission

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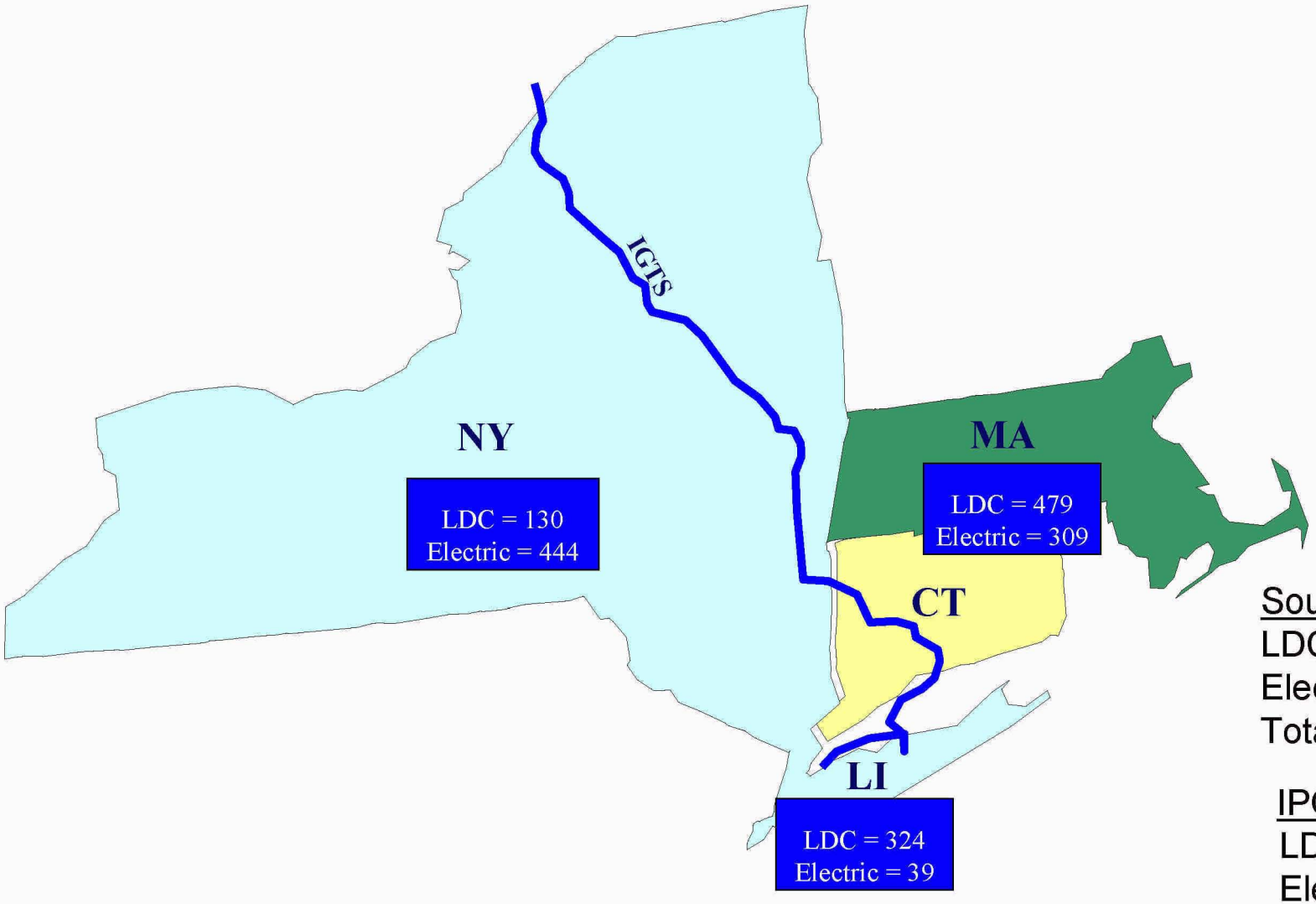
Downstate NY and Southern New England Market Growth (MDt/d) 2005-2015



Downstate NY
LDC = 454
Electric = 483
Total = 937

Southern New England
LDC = 479
Electric = 309
Total = 788

IPOC Marketplace
LDC = 933
Electric = 792
Total = 1,725

Data Source: Iroquois Gas Transmission

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Broadwater Market Study

- EEA Market Study – included as Appendix A to FERC Resource Report 1

- *Regional Market Growth and the Need for LNG Imports into the Northeast U.S. and Canada*, Energy and Environmental Analysis, October 2005.

Iroquois Meter Station Delivery Capacities

From: IGTS Design Capacity Report 11-Jun-07
http://online1.iroquois.com/new-internet/igts/iol/informationalpostings/Reports/formdesigncap.asp

State	Sequence	Meter No.	Interconnection	Loc Name	Loc	Loc/QTI Desc	Design Capacity	Meas Basis Desc	Loc Purp Desc
NY			TCPL	Waddington	67707	Receipt Point Quantity	1,195,000	Million BTUs	Receipt Location
NY	7	6	Consolidated	Canajoharie	68097	Delivery Point Quantity	267,110	Million BTUs	Delivery Location
NY	8	1	Tennessee	Wright	16409	Delivery Point Quantity	515,900	Million BTUs	Delivery Location
CT	12	4	Algonquin	Brookfield	68098	Delivery Point Quantity	441,100	Million BTUs	Delivery Location
CT	13	5	Tennessee	Shelton A	68099	Delivery Point Quantity	536,200	Million BTUs	Delivery Location
							1,760,310		
NY	1	7		Lisbon	68096	Delivery Point Quantity	216,502	Million BTUs	Delivery Location
NY	2	11		Edwards	110761	Delivery Point Quantity	167,900	Million BTUs	Delivery Location
NY	3	17		Croghan	147193	Delivery Point Quantity	196,300	Million BTUs	Delivery Location
NY	4	16		New Bremen	147192	Delivery Point Quantity	96,718	Million BTUs	Delivery Location
NY	5	18		Burdicks Crossing	226842	Delivery Point Quantity	44,000	Million BTUs	Delivery Location
NY	6	22		Boonville	264332	Delivery Point Quantity	5,058	Million BTUs	Delivery Location
NY	9	24		Athens	349565	Delivery Point Quantity	430,000	Million BTUs	Delivery Location
NY	10	2		Pleasant Valley	67577	Delivery Point Quantity	364,200	Million BTUs	Delivery Location
							1,520,678		
CT	11	3		New Milford	67578	Delivery Point Quantity	196,200	Million BTUs	Delivery Location
CT	14	12		Shelton B	68100	Delivery Point Quantity	135,600	Million BTUs	Delivery Location
CT	15	20		Stratford	245206	Delivery Point Quantity	232,600	Million BTUs	Delivery Location
CT	16	23		Milford	68101	Delivery Point Quantity	131,500	Million BTUs	Delivery Location
CT	17	23		Milford B	281335	Delivery Point Quantity	218,500	Million BTUs	Delivery Location
CT	18	15		Devon	147191	Delivery Point Quantity	174,000	Million BTUs	Delivery Location
							1,088,400		
NY	19	14		Northport	110768	Delivery Point Quantity	500,800	Million BTUs	Delivery Location
NY	20	9		South Commack	68102	Delivery Point Quantity	753,000	Million BTUs	Delivery Location
NY	21	25		Hunts Point	321765	Delivery Point Quantity	360,000	Million BTUs	Delivery Location
							1,613,800		

TOTAL Delivery Point Quantity 5,983,188

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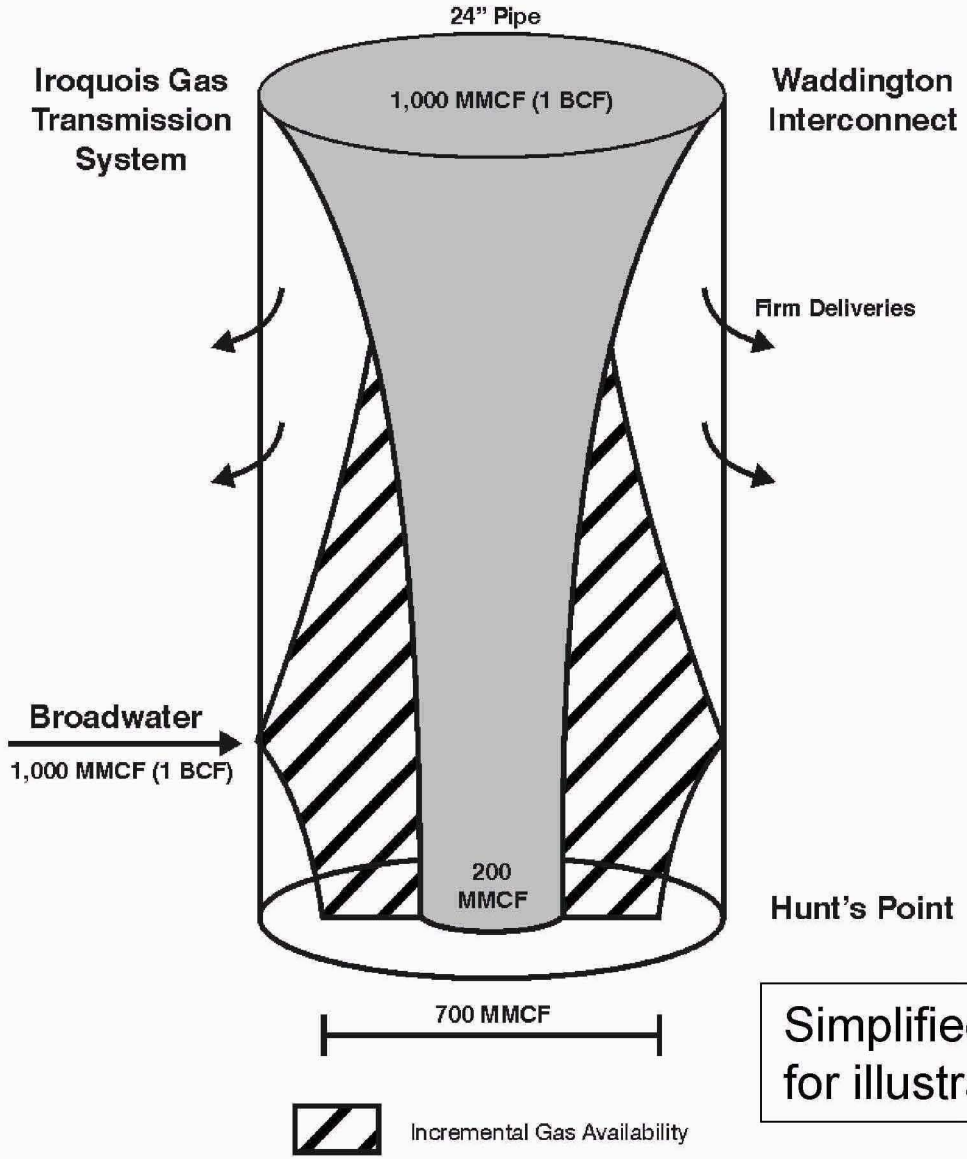
Pipeline Capacity



- System is part of a grid – pipeline segments interconnected
- Different ways to generate capacity – exchanges, backhauls, construction of new pipeline
- Interplay between pipeline design, operating pressures, supply and demand and contracts

Simplified example - for illustration only

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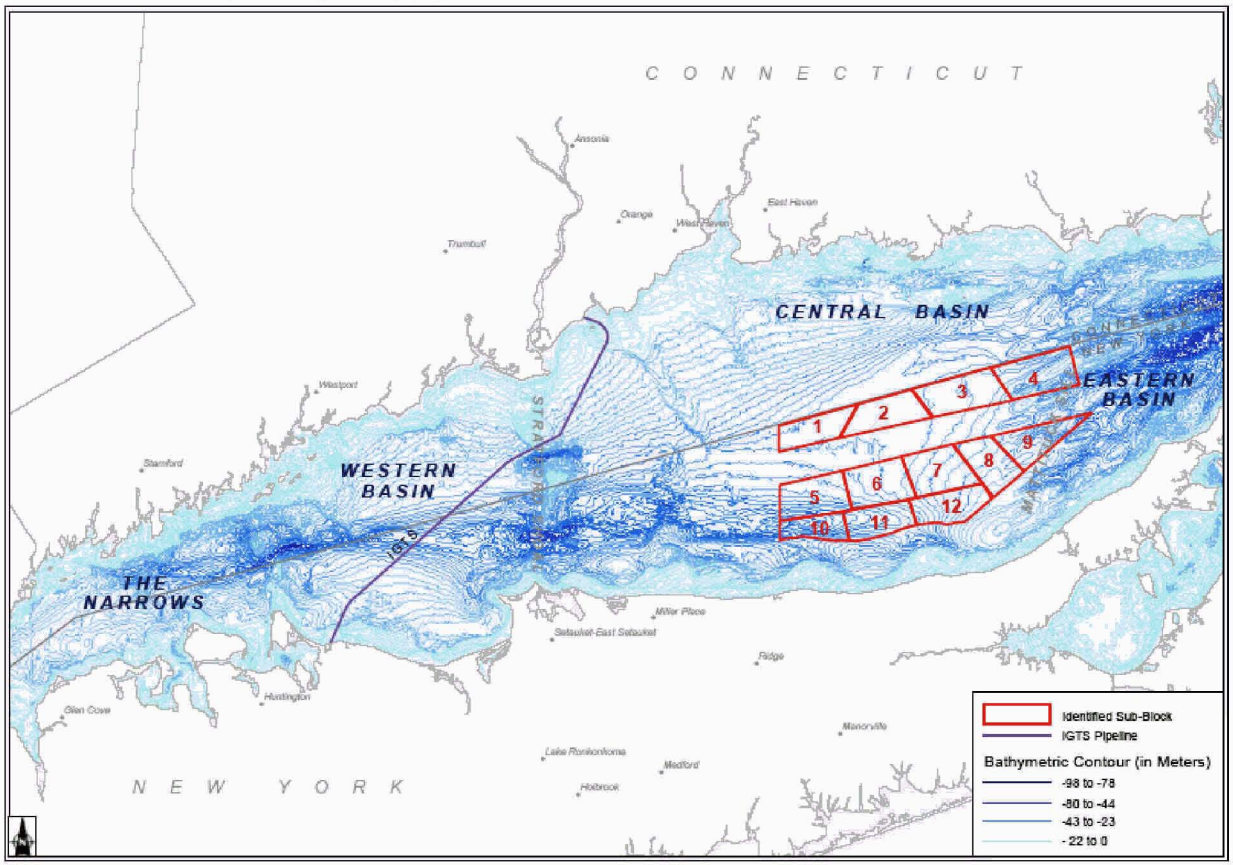
Impact of New Capacity on Market

- Interstate Natural Gas Association (www.ingaa.org)
  - *Updated Assessment of Pipeline and Storage Infrastructure for the North American Gas Market: Adverse Consequences of Delays in the Construction of Natural Gas Infrastructure*, Energy and Environmental Analysis, 2004.
- Long Island Power Authority – project assessment
- Assessment of Cove Point reactivation

Proximity to Existing Industrial Facilities



- Refer to FERC Resource Report 10, Section 10.6 (Alternate LNG Terminal Sites)
- Sections 10.6.2 to 10.6.5 address the choice of the preferred sub-block within Long Island Sound
- Many factors taken in to account
- Safety and security considerations were key consideration in siting (LIS Policy 13.4)

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Visual Comparison of Vessel Sizes

- A visual comparison of vessel sizes would not provide a different conclusion for the visual impact analysis
- No significant difference in the visual perception since the facility is so far from shore
- Literature indicates that the greatest visual impacts are related to structures with details that can be perceived and compared to their surroundings (e.g. a historic neighborhood with new modern development that stands out against the normal visual plane)
- Any additional assessment of visual impacts for a fixed versus moving vessel 9-miles offshore is immeasurable and may vary depending on each receptors perception of the viewshed; thus the differing degree of impact is not significant

Areas of Concern

1) FSRU - commercial fishing
2) LNG carrier impacts – other vessels using Sound
3) Public access
4) Visual impact
5) Safety and security
6) Community impacts

Commercial Fishing Impacts – FSRU S/S Zone

Minimization

- Appendix F of Coastal Zone application

Potential Offsets

- Fishery Liaison Committee formed
- Commitment to compensation for demonstrated loss (gear damage, displacement) as warranted
- Proposal to enhance resource sustainability of fishery
- Indirect resource restoration (e.g. offshore habitat)

LNG Carrier Impacts – Other Vessels Using Sound

<u>Minimization</u>

- Appendix I (Boat traffic survey) – limited traffic at FSRU location
- Scheduling - advance notice of LNG carrier visit (Notice to Mariners) - common procedure in use today
- Primary LNG carrier approach is Point Judith (deeper water); Block Island is secondary
- 2-3 visits per week; moving S/S zone – not an exclusion zone
- Table 4-8, p. 129 of WSR estimates time to clear channel (e.g. 5 knots = 4.7 minutes)

<u>Potential Offsets</u>

- Commitment to compensation for demonstrated loss (gear damage, displacement) as warranted

Public Access Impacts – S/S Zone

Minimization

- S/S zone comprises 0.12% of the area of Long Island Sound (WSR)
- Offshore location maximizes safety without impacting other uses which are more typically nearshore (e.g. recreational boating)

Potential Offsets

- Activities to increase long-term viability
  - Offshore habitat restoration
  - Submerged aquatic vegetation
  - Onshore habitat restoration (LISS)
- Nearshore public access improvements
  - Beach access
  - Boating access
  - Walkway/boardwalk
  - Congestion issues in coastal areas (e.g. Port Jefferson)

Visual Impacts

Minimization

- Facility designed to move as much equipment as possible off the deck in order to reduce profile above the waterline
- Siting facility in widest portion of Long Island Sound - 9 miles from nearest vantage point
- Visual profile not fixed – varies with wind and current conditions, reducing length perception from coastal view
- Ship-like appearance consistent with current visual canvas
- Color choice will achieve goal of minimizing contrast with surrounding environment
  - Subject to Coast Guard/FERC approval – no position as yet

Potential Offsets

- Minimize visibility from inland vantage points – onshore vegetation
- Creation or improvement of onshore viewing areas or viewshed
- Coastal building demolition or rehabilitation
- Historical structure rehabilitation

Safety and Security (1)

- Resource Report 11, Section 11.3.5 – FSRU Security
  - Development of Security Plans, Policies and Procedures
  - Preliminary Project Security Assessment and Overview (PPSAO) has been provided to Coast Guard (report is Sensitive Security Information)
- Section 11.4.2 - Safety Features of LNG Carriers
- Section 11.4.3 - LNG Carrier Security

Safety and Security (2)

Draft EIS, page 5-23 to 5-24

40. Broadwater shall develop an Emergency Response Plan and coordinate procedures with the Coast Guard; state, county, and local emergency planning groups; fire departments; state and local law enforcement; and appropriate Federal agencies. This plan shall include at a minimum:
    - a. designated contacts with state and local emergency response agencies;
    - b. scalable procedures for the prompt notification of appropriate local officials and emergency response agencies based on the level and severity of potential incidents;
    - c. procedures for notifying residents and recreational users within areas of potential hazard;
    - d. evacuation routes/methods for residents and other public use areas that are within any transient hazard areas along the route of the LNG carrier transit;
    - e. locations of permanent sirens and other warning devices;
    - f. an "emergency coordinator" on each LNG carrier to activate sirens and other warning devices;
    - g. provisions to address the recommendations contained in Section 6.2 of the U.S Coast Guard Captain of the Port Long Island Sound Waterways Suitability Report for the Proposed Broadwater Liquefied Natural Gas Facility;
    - h. procedures for off-loading LNG from the FSRU to LNG carrier in the event that the FSRU must be removed from the mooring; and
    - i. procedures for pumping down the LNG onboard the FSRU in preparation for severe weather events such as a hurricane.

- The Emergency Response Plan shall be filed with the Secretary for review and written approval by the Director of OEP **prior to keel laying or any other Project-related construction activity**. Broadwater shall notify FERC staff of all planning meetings in advance and shall report progress on the development of its Emergency Response Plan **at 3-month** intervals. ***(Section 3.10.6)***

Safety and Security (3)

41. The Emergency Response Plan shall include a Cost-Sharing Plan identifying the mechanisms for funding all Project-specific security/emergency management costs that would be imposed on state and local agencies. In addition to the funding of direct transit-related security/emergency management costs, this comprehensive plan shall include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base. The Cost-Sharing Plan shall be filed with the Secretary for review and written approval by the Director of OEP **prior to keel laying or any other Project-related construction activity**. ***(Section 3.10.6)***

Safety Enhancements – Firefighting Tugs (1)

- Resource Report 11, page 11-45
- Illustrative tug boat configuration – used at Cove Point, MD

EMILY ANNE McALLISTER

#1137521

GENERAL

Built:	2003 Eastern Shipbuilding Panama City, FL
Flag:	U.S.A.
Type of Equipment:	Tug
Radio Call Sign:	WD5443

DIMENSIONS

Length:	96'
Breadth:	34'
Depth:	14.9'
Registered Gross Tonnage:	189
Registered Net Tonnage:	124

CAPACITIES

Fuel Oil:	28,280 gal.
Lube Oil:	500 gal.
Potable Water:	6,700 gal.
Free Running Speed	12 Knots
H.P:	5,000
AFF Foam	3,000 gal

ABS CLASS: +A-1 Towing; +AMS,
+A-1 Fire Fighting (FiFi 1)
ABS Escort

MACHINERY

Main Engines:	(2)EMD 12 - 645-E7B with Remote Control Start/Stop capability
Propulsion System:	(2) Shottel SRP 1212F Steerable Kort Nozzle Rudder Propellers
Towing Gear:	(1) Fwd. / (1) Aft Jon Rie Hawser Winches 450' of 7" Amstel Blue synthetic
Automation:	Full Engine Room Monitoring System w/ Remote Monitoring Capability at Main Helm

NAVIGATION & COMMUNICATION

Radar:	(2) Furuno FR7062/4
Gyro Compass:	Simrad Robertson RGC50
VHF Radio:	(3) ICOM M-502
DGPS:	(2) Furuno GP-37
Fathometer:	Furuno RD-30 Digi-Depth

SAFETY

Fire Fighting:	(2) 12V-92TA w/ Nijhuis HGT1 Pumps @ 11,600 GPM (2) Skum MK-250EL/VR Remote Controlled Monitors with Foam Injection Capability with 1,100 GPM Deluge system
EPIRB:	ACR 5850 Cat. 1

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Safety Enhancements – Firefighting Tugs (2)

FERC Resource Report 11, pages 11-44 and 11-45 - the main components of Fi-Fi Class 1 are as follows:

- Two marine water/foam monitors capable of delivering a minimum combined total of 2,400 cubic meters of water per hour at a minimum range of 120 meters and minimum trajectory height of 45 meters; also capable of producing a total of 15,000 litres per minute of foam solution at a minimum range of 65 meters and geared for both vertical and horizontal movement from a remote station. Each monitor shall be served by a dedicated pump and prime mover of commensurate capacity. The pump and prime mover serving one monitor shall be independent of the pump and prime mover serving the other. The vertical pivot point of the monitors shall be not less than 17 meters above the water.
- A fog nozzle of adequate capacity to fit one of the monitors.
- A water spray system for self protection. The system shall be capable of delivering a spray of water over all the exposed external vertical surfaces of the hull, superstructure, deckhouses and monitor positions. Minimum rate of application shall be 10 litres per square metre per minute.
- Fire Hydrants, Branches, Nozzles and Hoses in accordance with Flag State or Classification Society requirements.
- Capability and equipment to supply water to the FSRU in the event of malfunction of fire pumps.

Table 11-11 Assessed Tug Support Requirements

	Winter	Summer
Small LNG Carrier Berthing	3 tugs	3 tugs
Small LNG Carrier Unberthing	2 tugs	2 tugs
Large LNG Carrier Berthing	4 tugs	3 tugs
Large LNG Carrier Unberthing	3 tugs	2 tugs

Safety and Security (4)

Minimization

- Offshore location minimizes nearshore impacts
- Local jurisdictions will be largely unaffected on a day-to-day basis
- Areas of greatest coastal use avoided

Potential Offsets

- Tugs are potential firefighting resource for North Shore
- Coordinate as part of Emergency Response Planning process – additional resource
- Shore base location on Long Island - preferential response capability
- Local agencies will not bear costs

Community Character (1)

Minimization

- Offshore energy facilities do not imply diminution of community character
  - Appendix E – Marine/Land Use Compatibility Assessment
  - Appendix M – Real Property Value Market Analysis Study
  - Appendix N – Long Island Sound Use Patterns and Trend Study

- Potential displacement of commercial vessel transits carrying petroleum products (oil and derivatives) resulting in reduced pollution risk to coastal areas – LNG has no residual spill issues
- Ongoing impacts associated with passing tankers and coal carriers, lightering activities in the Sound
- Northville terminal and other industrial facilities with greater visibility are currently in operation – reduced reliance on oil could accelerate retirement
- Use of existing onshore base to preserve marine uses of the Sound

Community Character (2)

Potential Offsets

- Proposal to enhance resource sustainability of fishery to preserve traditional coastal uses
- Land preservation – loss of vegetation contributes to runoff problems that account for nitrogen loading in the Sound
- Shore base improvements would assist in rehabilitation of older waterfront facilities (loading facilities, warehouse facilities, office)
- Shore base facilities would match local character
- Benefits associated with project (jobs, taxes, local expenditures) preserve local economic base – marine-based employment
- Long Island North Shore Heritage Area has identified a number of potential opportunities which are complimentary to Long Island Sound Coast Management Policies
- Integration with Broadwater Social Investment Plan

Broadwater Social Investment Program

- Discussed in Appendix L
- Proposed program with annual contributions of $2-3 million per year – engaging with community and environmental stakeholders regarding process for program development
- Commitment of funding to directly support habitat restoration and conservation programs in Long Island Sound
  - Examples of target programs identified:
    - Long Island Sound-specific water quality index
    - Preventing/controlling invasive species
    - LISS Floatable Debris program

Broadwater Energy

Fifth Technical Data Meeting

Meeting with New York Department of State Coastal Resources Division

July 24, 2007
Albany, New York

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Engagement Process

- July 2007 meeting – discuss measures to minimize impacts concerning identified areas of concern and otherwise demonstrate consistency with applicable and enforceable coastal zone policies
- August 1, 2007 – NYSDOS to identify list issues it considers “open” concerning Atlantic alternatives
- August 2007 – address the open issues and mitigation opportunities for identified areas of concern

Identified Areas of Concern

1) Commercial Fishing
2) LNG carrier impacts – other vessels using Sound
3) Public access
4) Visual impact
5) Safety and Security/Emergency Response
6) Community impacts

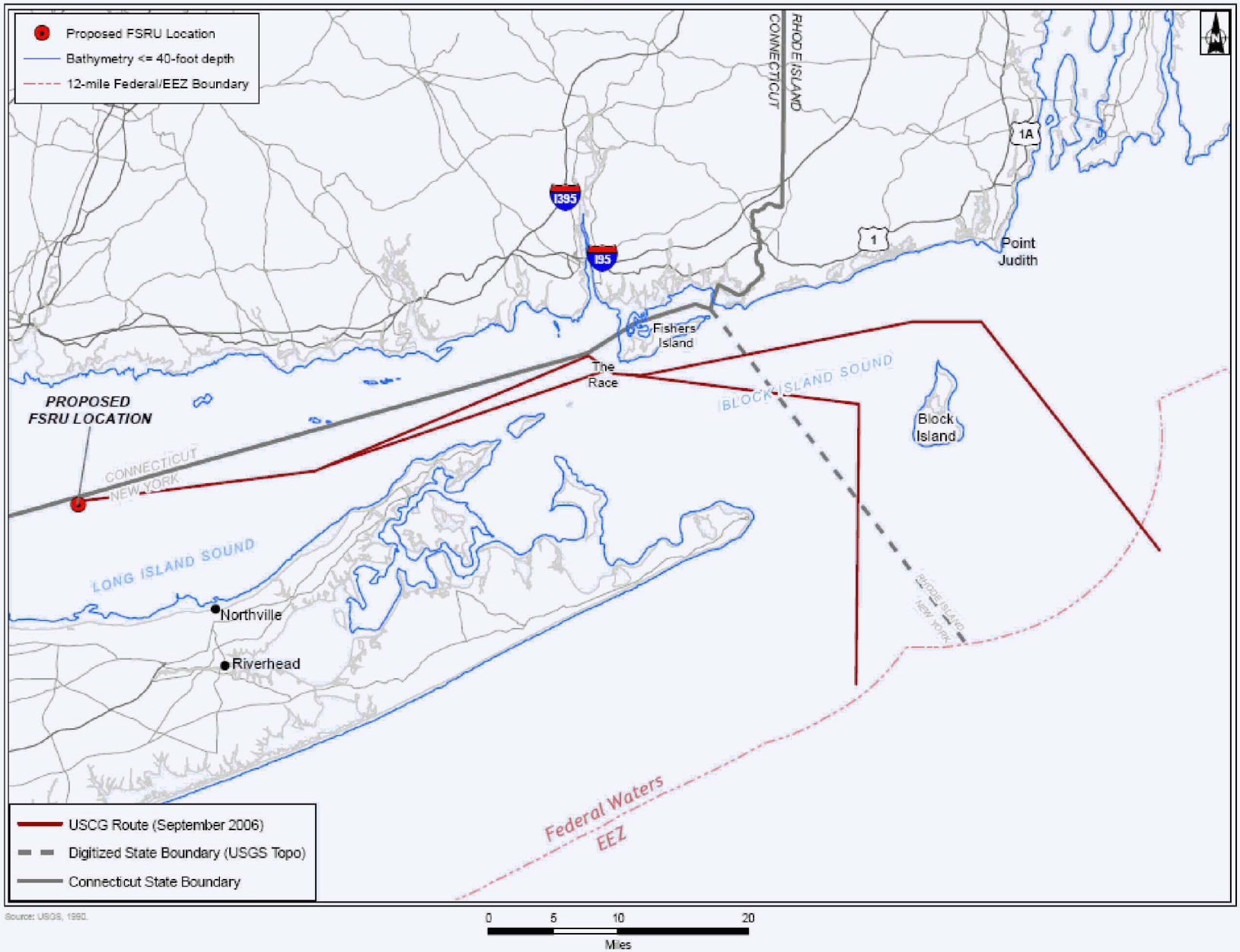
Commercial Fishing Impacts – FSRU S/S Zone

- Initial consultation was conducted with fishing interests during the siting process
  - FSRU site was relocated from original choice to reduce fishing conflicts/impacts
- Consultation about fishing operations in FSRU Safety and Security Zone
  - Preference expressed not to conduct operations due to excessive gear loss and damage (FSRU and LNG carrier operations within the zone)

Discussion - Commercial Fishing Impacts

- Limited opportunities to further minimize impacts on commercial fishing in S/S zone
- NYSDOS views on consistency

LNG Carrier Routes per Coast Guard WSA



LNG Carrier Residence in Long Island Sound (1)

- Distance from pilot's station to FSRU approx. 50 nautical miles (nm)
- LNG carrier speed approx. 12 knots
- Transit time
  - 5 hours to FSRU, 5 hours to station = 10 hours per visit
- LNG carrier visits – 2-3 times per week
- Range of time LNG carrier is transiting LIS
  - Low case: 2 visits x 10 hrs x 52 weeks = 1040 hrs/yr *(11.8% of the year)*
  - High case: 3 visits x 10 hrs x 52 weeks = 1560 hrs/yr *(17.8 % of the year)*

LNG Carrier Residence in Long Island Sound (2)

- LNG carrier S/S zone (moving with carrier)
  - 2 nm in front, 1 nm in back, 750 yards either side
- Time to traverse 3 nm at 12 knots
  - LNG carriers passes in 3 nm/12 knots = 0.25 hrs = 15 minutes
- Assume LIS user must vacate and return to S/S zone
  - Assume user can travel at 5 knots
  - Travel time back and forth = 5 minutes each way = 10 minutes total
- Total impact on passing point per visit = 25 minutes each way = 50 minutes per visit
- Range of time LNG carrier affects any transit point
  - Low case: 2 visits/wk x 50 min x 52 weeks = 87 hrs/yr *(1.0% of the time)*
  - High case: 3 visits/wk x 50 min x 52 weeks = 130 hrs/yr *(1.5% % of the time)*
- Does not account for deliveries in winter months or deliveries occurring at night, which would further reduce potential use conflicts

BROADWATER

Boat Traffic Survey – Appendix I of CZCC

- Conducted in 2005
- Memorial Day weekend, Fathers Day weekend, July 4th weekend, July 29-30 weekend and Labor Day weekend
- High boat densities proximate to Stratford Shoals
  - Few recreational or commercial boats observed outside this area
- 2 commercial lobster boats
- 3 commercial barges within 1 mile
- 181 boats recorded – approx. 2.1 boats within 0.6 miles of the FSRU per survey hour during busiest days

Project siting choice designed to minimize conflicts/impacts – offshore location 9 miles from shore

LNG Carrier Impacts - Scheduling

- Scheduling - advance notice of LNG carrier visits (Notice to Mariners)
  - Early warning to other Sound users
- Coast Guard has authority over LNG carrier transits from pilots station to FSRU
  - USCG will develop a LNG Transit Plan for Long Island Sound
  - Developed in consultation with marine community
  - Review opportunities to reduce impacts
  - USCG would retain authority to assess each arrival on case-by-case basis
- Prepared to review delivery schedule plans to accommodate special events (e.g. regattas), subject to USCG guidance

Waterway Suitability Report (1)

- Page 155 – Escort Tugs
  - General consensus that deployment of escort tugs would be prudent
  - Serve as picket boats – assist Coast Guard in patrolling S/S zone around LNG carrier
  - Able to take LNG carrier in tow in the event of sudden loss of steering or propulsion
  - Immediate response to a fire in the event of a collision or grounding

> "Escort tugs were considered to have a moderate to significant impact on reducing risks associated with the consequences of a navigation safety accident." (WSR p. 155)

- Subject to Coast Guard approval:
  - Two escort tugs (minimum) will be made available for each LNG carrier arrival
  - One escort tug (minimum) for each LNG carrier departure

Waterway Suitability Report (2)

- WSR page 161:
- "The Race is a critical waterway connecting Block Island Sound and Long Island Sound used for national defense, commerce and recreation. The impacts of the moving safety and security zone around LNG carriers could be managed." (emphasis added)

Discussion – LNG Carrier Transit Impacts

- Minimization opportunities
  - S/S zone conflicts/impacts transitory in nature
  - Scheduling around significant events (e.g. regattas) with USCG concurrence
  - Use of escort tugs to manage moving S/S zone and reduce impacts (2 for arrivals, 1 for departures)
- NYSDOS views on consistency

Public Access Impacts – S/S Zone

- S/S zone around FSRU comprises 0.12% of the area of Long Island Sound (WSR)
- Offshore location maximizes safety without impacting other uses which are more typically nearshore (e.g. recreational boating)
- S/S zone around LNG carriers transient in nature
  - Advance notice provided
  - Large waterway

Discussion – Public Access

- Limited opportunities to further minimize public access impacts around FSRU
- NYSDOS views on consistency

Visual Impacts - General

- Facility designed to move as much equipment as possible off the deck in order to reduce profile above the waterline
  - Process heaters located in mechanical space of hull
- Siting facility in widest portion of Long Island Sound – 9 miles from nearest vantage point
- Visual profile not fixed – varies with wind and current conditions, reducing length perception from coastal view
- Ship-like appearance consistent with current visual canvas
- Color choice will achieve goal of minimizing contrast with surrounding environment
  - Subject to Coast Guard/FERC approval – no position as yet
- Pipeline construction activities during winter months – reduced visibility

Visual Impacts - Lighting

- Broadwater will conduct an illumination survey for the FSRU in the shipyard after construction is complete to verify that actual illumination levels conform to design values
  - Significant deviations can be addressed at that time, and may include substitution of lighting elements or the addition of further shielding to reduce illumination levels

- DEIS page 5-21 – Condition 22 – Prior to placing the FSRU into operation, Broadwater shall file the final FSRU lighting plan with the FERC Secretary for review and written approval by the Director of the Office of Energy Projects

- After installation, Broadwater will conduct an on-site illumination survey to validate illumination conditions for the FSRU as installed and the mooring tower facility

Discussion - Visual Impacts

- Offshore location reduces visual impact to maximum extent possible

- NYSDOS views on consistency

Waterway Suitability Report

- Page 155 – Escort Tugs
  - General consensus that deployment of escort tugs would be prudent
  - Serve as picket boats – assist Coast Guard in patrolling S/S zone around LNG carrier
  - Able to take LNG carrier in tow in the event of sudden loss of steering or propulsion
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- Subject to Coast Guard approval:
  - Two escort tugs (minimum) will be made available for each LNG carrier arrival
  - One escort tug (minimum) for each LNG carrier departure

Safety and Security – Firefighting Tugs

- Tugs not deployed in operations could be deployed for regional marine firefighting response.
- Broadwater prepared to discuss the role it could play in strengthening marine firefighting response for the north shore of Long Island

Table 11-11 Assessed Tug Support Requirements		
	Winter	**Summer**
Small LNG Carrier Berthing	3 tugs	3 tugs
Small LNG Carrier Unberthing	2 tugs	2 tugs
Large LNG Carrier Berthing	4 tugs	3 tugs
Large LNG Carrier Unberthing	3 tugs	2 tugs

Emergency Response Plan – Development Process

Table of Contents

1. Strategic Approach for the ERP Development Process ("ERPDP") **- completed**
2. Phase I – Data Gathering and Submission of ERPDP to the U.S. Coast Guard **- completed**
3. Phase II – Emergency Response Community Meetings ("ERCM") **- underway**
4. Phase III – Area ERP Working Committee ("AEWC")
5. Phase IV – Compiling the Emergency Response Plan

Safety and Security - Collision Avoidance

- Refer to Section 11.3.3.2, RR#11

- FSRU equipped with complete suite of communications equipment and navigational aids in accordance with USCG requirements
  - **Radar beacon** – full dual band radar beacon with transponder operating at marine and air frequencies
  - **Radar systems** – 2 complete sets of long range radar with range alarms for detection of vessels in vicinity of the FSRU
  - **Navigational aids** – navigation and aviation warning lights; main 2-mile and standby 0.5 mile foghorns at each end of facility

- Use of this equipment will contribute to minimizing safety and security conflicts/impacts

Safety and Security - Telecomm Onboard FSRU

- VHF FM Marine radio system
- MF/HF Marine radio system
- VHF AM Aeronautical radio system
- UHF repeater system – UHF handheld radios
- Non-directional beacon
- Crane radio system
- Lifeboat and rescue craft radio systems (VHF radios and other)
- NAVTEX - international automated direct-printing service for delivery of navigational and meteorological warnings and forecasts
- PABX telephone system
- Global Maritime Distress and Safety System (GMDSS)
- Weather monitoring system
- Berthing aid system
- Ethernet/LAN Closed-circuit TV system
- Business LAN
- FSRU to Shore WAN link
- Collision avoidance radar system

Potential for assistance to USCG in surveillance and monitoring activities from central Sound location

BROADWATER

Discussion - Safety and Security

- Offshore location minimizes nearshore impacts
- Municipalities will be largely unaffected on a day-to-day basis
- Nearshore areas of greatest coastal use avoided
- Self-sufficient in marine firefighting capability

- NYSDOS views on consistency

Community Character

- Potential displacement of commercial vessel transits carrying petroleum products (oil and derivatives) resulting in reduced pollution risk to coastal areas – LNG has no residual spill issues
- Ongoing impacts associated with passing tankers and coal carriers, lightering activities in the Sound
- Northville terminal and other industrial facilities with greater visibility are currently in operation – reduced reliance on oil could accelerate retirement
- Use of existing onshore base to preserve marine uses of the Sound

Discussion – Community Character

- Offshore location mitigates community character conflicts/impacts to maximum extent possible

- NYSDOS views on consistency

Appendix 2

Information Response Provided on June 22, 2007

BROADWATER

Broadwater Energy
c/o TransCanada Corporation
450 – 1st Street S.W.
Calgary, Alberta, Canada
T2P 5H1

June 22, 2007

George R. Stafford, Director
New York State Department of State
Division of Coastal Resources
41 State Street
Albany, New York, U.S.A.
12231-0001

Dear Mr. Stafford:

Subject: Information Request Responses from June 13, 2007 Meeting

In response to requests for additional information relating to the proposed Broadwater Energy project from our recent meeting on June 13, 2007, please find enclosed two sets of documents:

(1) **Iroquois pipeline contracts** – at our meeting, you requested information on the transportation pipeline contacts on the Iroquois system, specifically those on Long Island. Please find enclosed a complete index of customers for the Iroquois Gas Transmission System. This information is public information and was obtained from Iroquois' website. The relevant location on the website is provided in the attached documentation.

(2) **Lobster restoration program** – your staff requested further information on lobster restoration programs. The attached documentation provides general and technical details concerning a restoration program currently implemented in Rhode Island.

If there are any questions concerning the attached information, please feel free to contact me.

ORIGINAL SIGNED

Murray Sondergard
Project Director

Cc: Robert Alessi (LeBoeuf, Lamb, Greene & MacRae) - w/o attach
John Hritcko (Broadwater) – w/o attach

North Cape Fact Sheet, General

North Cape Lobster Restoration Program

North Cape Shellfish Restoration Program

North Cape Fish Passage Restoration Program

USF&WS North Cape Bird Restoration Program

Loon Restoration Projects

Map of Maine Projects

News Release

RI Department of Environmental Management
235 Promenade Street, Providence, RI 02908
(401) 222-2771 TDD/(401) 222-4462

For Release: **August 10, 2006**

Contact: **Gail Mastrati 222-4700 ext. 2402**
Mary Kay, DEM, 401-222-4700 ext. 2304
John Catena, NOAA, 978-281-9251; 978-317-9566 (cell)
Molly Sperduto, US F&WS, 603-223-2541

NORTH CAPE OIL SPILL TRUSTEES AND INDUSTRY SUCCESSFULLY COMPLETE *NORTH CAPE* LOBSTER RESTORATION PROGRAM

PROVIDENCE - Governor Donald L. Carcieri, Senator Jack Reed, federal officials, anc representatives from the fishing and oil shipping industries gathered today at the Department of Environmental Management's Marine Fisheries Center in Jamestown to celebrate the completion of the *North Cape* Lobster Restoration Program and to "v-notc the programs last lobster. The event was the culmination of more than six years of effor restore Rhode Island's lobster population, which was significantly impacted by the 1996 *North Cape* oil spill.

The 1996 *North Cape* oil spill occurred when the 340-foot *North Cape* oil barge ran aground off Moonstone Beach, after its tug caught fire during a severe winter storm. Ov 828,000 gallons of home heating oil spilled into local waters, killing an estimated nine million lobsters, millions of surf clams, fish, birds, and other organisms. DEM and Nati Oceanic and Atmospheric Administration (NOAA) scientists recommended that the notching and protection of female lobsters was necessary to eventually replace the estimated nine million lobsters killed by the oil spill.

The *North Cape* Lobster Restoration Program began in 2000, and was completed in Jun this year. The project manager, Ocean Technology Foundation, hired and trained observ and worked with over 150 fishermen in RI and MA to complete the project. The restora involved cutting a v-shaped notch in the tail of 1.248 million female lobsters and restocl them into RI and southeastern MA coastal waters. These female lobsters are now protec from harvest for an additional one to two years while the v-notch is still visible; harvesti of v-notched lobsters is prohibited by law. Allowing lobsters to live longer gives them n opportunity to reproduce, yielding increased numbers of offspring.

"This partnership between Rhode Island's fishermen and marine biologists has been a tremendous success. It has helped to restore our lobster population, and it has ensured th

this important piece of our economy will continue," Governor Carcieri said. "Restoring lobster population represents part of a larger effort to restore our coastal habitat. We hav worked closely with the National Oceanic and Atmospheric Administration and the U.S Fish & Wildlife Service to increase our shellfish population, protect sensitive wetlands, allow piping plovers to flourish."

"This project was a tremendous success for the lobster resource and for those who depei on it for their livelihood," said Patricia Kurkul, administrator of NOAA's National Mari Fisheries Service Northeast Region. "The cooperative effort between the state and feder government, K-Sea Transportation, and the fishing industry is a terrific model for simila oil spill restoration activities."

After extensive scientific assessment of oil spill damages, trustee agencies under the authority of the federal Oil Pollution Act reached a settlement with the responsible party K-Sea Transportation, in June 2000. The terms of the settlement required the responsibl party to implement and manage the lobster restoration program and to pay to the trustee agencies:

- $1.6 million for land acquisition adjacent to Rhode Island's coastal salt ponds
- $1.5 million for a multi-species shellfish restoration project
- $3 million to purchase and protect loon nesting habitat
- $400,000 to purchase and protect eider nesting habitat
- $140,000 to manage and protect piping plover nesting habitat
- $160,000 to implement an anadromous fish restoration project
- $800,000 to oversee and monitor the lobster restoration project

"I commend all the Rhode Islanders and federal agencies who pulled together to clean u our coastal environment and rebuild our state's lobster and shellfish populations after th *North Cape* oil spill," said U.S. Senator Jack Reed. "The *North Cape* settlement set a national precedent for restoring the environment after oil spills. Today we celebrate hov we have come in restoring our fisheries and we renew our commitment to preserving th natural resources for future generations."

The Trustees and the Responsible Party began restoration in 2000. Key accomplishment date:

- Completed the v-notching and protection of 1.248 million legal-size female lobste in Rhode Island Sound

- Purchased a conservation easement and secured permanent protection for 60 acre land adjacent to Ninigret Pond

- Contributed to the acquisition and protection of 1.5 million acres of land in Maine protect over 125 loon nesting pair and their habitat

- Acquired and protected a 42-acre island off the coast of Maine to conserve over 6 nesting pair of eider

- Constructed a fish ladder on Indian Lake in South Kingstown, opening up 220 acr of spawning habitat for migrating alewife

- Increased the number of piping plover nesting pairs on Rhode Island's South Cou beaches by 60%

- Increased populations of oysters, bay scallops, and quahogs in numerous location Narragansett Bay and the coastal salt ponds.

"Today's celebration highlights an immensely successful program that restored fish and wildlife from Rhode Island to Maine," remarked Michael Thabault, assistant regional director of the U.S. Fish and Wildlife Service's Region 5. Government, industry, private organizations and foundations, and hundreds of volunteers worked together to protect a improve natural resources destroyed by the *North Cape* oil spill."

"The completion of the *North Cape* Lobster Restoration Project is a perfect example of industry working together with state and federal agencies to accomplish a positive outc for the resource," noted Lanny Dellinger, President of the Rhode Island Lobstermen's Association. "The Rhode Island lobster industry is optimistic that this positive co-management relationship will continue, including the process of determining future management decisions that are vital for the future of a sustainable fishery. The Rhode Island Lobstermen's Association has purchased v-notching tools for its members to encourage the industry's continuation of this program. With the continued support of sta and federal agencies working together with industry, we can leave this resource in a bet condition for future generations to come."

Additional information on NOAA's Damage Assessment, Remediation, and Restoration Program is available online at http://www.darrp.noaa.gov/. Fact sheets on the North Ca Lobster Restoration Program and other North Cape restoration projects can be found by clicking on this press release's link on the home page of DEM's website, www.dem.ri.g

-30-

North Cape Oil Spill Restoration

National Oceanic and Atmospheric Administration
United States Fish and Wildlife Service
Rhode Island Department of Environmental Management
Ocean Technology Foundation

Lobster Restoration Program

Background

In January 1996, a 340-foot oil barge, the *North Cape*, ran aground off Moonstone Beach, Rhode Island after its tugboat caught fire during a severe winter storm. As a result, over 828,000 gallons of home heating oil spilled into local waters killing millions of surf clams, fish, birds and other organisms. An estimated 9 million lobsters were killed as a result of the spill.

USFWS

On January 19, 1996, the Tug Scandia and barge North Cape ran aground, spilling 828,000 gallons of home heating oil.

Restoring Lobsters

Over the past six years the responsible party funded a large-scale program to restore the lobsters injured by the oil spill. Individual lobsters were marked with a v-shaped notch in their tail. Notched lobsters are then protected by law and cannot be legally harvested until they molt, or change their shell, and the v-notch disappears. With this protection, the reproductive lives of the lobsters are extended.

Under the terms of the consent decree, the RP was required to v-notch and release 1.24 million legal size female lobsters. These 1.24 million v-notched lobsters will produce an estimated 23 billion eggs which will yield the 9 million lobsters lost by the spill

Methods

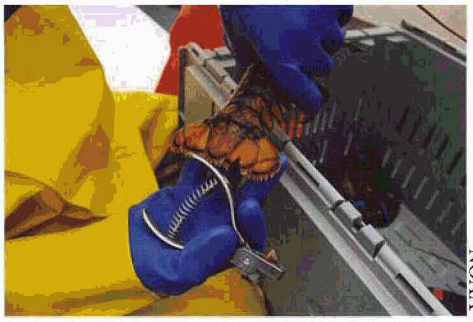
The Ocean Technology Foundation (OTF) was hired by the RP to manage the restoration effort and jointly determined with DEM, NOAA, and the commercial fishing industry that the best approach to accomplish this project was to use trained observers and fishermen to capture and release v-notch lobsters. Lobster fishermen that were involved in the program were paid for each lobster they v-notched and returned to the ocean. Restoration was conducted as far as 60 miles offshore and 30 miles east towards Martha's Vineyard.

Trained observers were assigned to lobster boats to accompany fishermen on their trips. As female lobsters were captured, they were inspected to determine eligibility, v-notched and released at their capture location. While onboard, observers also recorded recapture information of previously v-notched lobsters.

A rigorous monitoring program was also established to closely document the numbers of animals notched, their locations, and their health.

Highlights

Coordinated the v-notching of 1.24 million legal sized female lobsters.
Conducted restoration from western Rhode Island to southern Massachusetts.
Increased lobster egg abundance in southern New England waters.



NOAA

An OTF observer v-notches a lobster on-board a commercial vessel.

Increased Egg production

A v-notched lobster is a future egger! That's the motto of the *North Cape* Lobster Restoration Program. By prolonging harvest of female lobsters for two additional years (the approximate time it takes to lose their v-notch), the females are allowed another chance to reproduce. The success of the v-notch program is evident by the number of previously v-notched lobsters bearing eggs upon recapture.

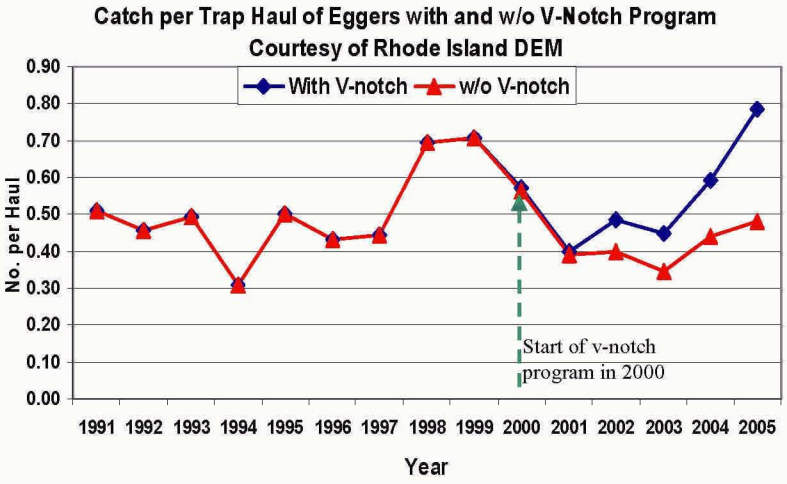
OTF

A previously v-notched female lobster is recaptured carrying eggs. Without the v-notch, this lobster could have been harvested before having the chance to reproduce again.

BW019267

Achievements

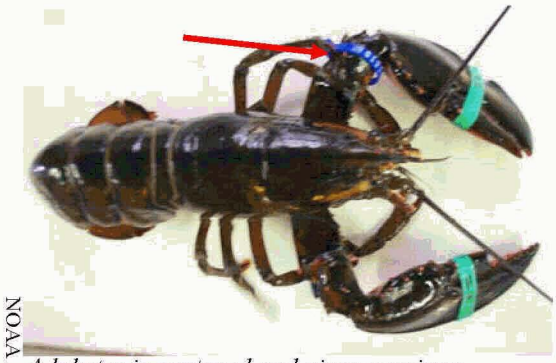
Recapture data from v-notched lobsters is demonstrating that many of the animals are reproducing, evident by the high number of v-notched lobsters bearing eggs upon recapture. In the graph to the right, scientists from Rhode Island DEM compared the contribution of egg bearing females in the lobster population with a v-notch (blue line) to lobsters without a v-notch (red line). Lobster fishermen and marine resource managers recognize the significant contributions being made by this restoration program to the future of the lobster fishery.



Scientific Assessment of the Lobsters

To track movement and determine survival rates of the v-notched lobsters, the Ocean Technology Foundation, NOAA and DEM cooperated to complete a successful tagging project that was conducted in conjunction with the v-notch program. A percentage of the notched lobsters was also equipped with a special tag which identified that individual lobster. Over 35,000 individual lobsters have been equipped with tags from 2003 to 2006.

When the lobster is released, the size, location and date of capture are recorded. When a lobster that has been tagged is recaptured the tag is not removed from the lobster. Instead the date, location of recapture, size of the lobster, shell condition and whether or not that lobster is carrying eggs or not is recorded. This recapture information gives scientists and managers valuable information such as migration patterns and survival of the animal. This type of information will help increase our understanding of lobsters and help ensure a strong lobster fishery in the future.



NOAA

A lobster is captured and given a unique identification number. When the lobster is recaptured, biologists can track the movement of the lobster, as well as gain other valuable data. The green rubber bands are removed before release.

Tank Studies

NOAA, RIDEM, and OTF also conducted scientific experiments to test the effect that v-notches had on lobsters, and to try to determine how long the legal v-notch lasts after the initial notch takes place. Preliminary analysis of the experiment shows no increased mortality from v-notching and no increase in the likelihood of shell disease from notched lobsters.

NOAA

Lobsters are held in tanks at the RIDEM wet lab in Jamestown, RI to perform v-notch experiments.

Our Thanks

NOAA, RIDEM, USFWS, and OTF would like to thank the community for their support of this effort. Particularly, we would like to thank the men and women of the commercial lobster fishery.

For more information, contact:

Bryan DeAngelis, NOAA: Bryan.DeAngelis@NOAA.gov; 401-782-3337; Ted Colburn, OTF: w.colburn@snet.net; 860-405-1198

Tom Angell, RIDEM: Thomas.Angell@dem.ri.gov; 401-423-1931; John Catena, NOAA: john.catena@noaa.gov; 978-281-9251

ANDREW DAMS

Estimating the Reduction in Fishing Mortality Rate on Area 2 Lobster Associated with the North Cape V-Notching Program

Mark R. Gibson

And

Tom E. Angell

Rhode Island Division of Fish and Wildlife
Marine Fisheries Section
3 Fort Wetherill Road
Jamestown, RI 02835
September 27, 2006

Introduction-

A recent assessment of the US Atlantic coast lobster resource indicated that the SNE stock was over fished and undergoing over fishing (ASMFC 2006a, 2006b). The SNE stock area includes waters south and west of Cape Cod down to Maryland's eastern shore. New biological reference points including biomass targets and thresholds were recommended in the assessment and formally adopted by the Atlantic States Marine Fisheries Commission (ASMFC) via addendum VIII to the lobster fishery management plan. Addendum XI is under development and will contain the actual measures required by states to reach the new reference points. A 10% reduction in fishing mortality (F) is required to reach the new target F rate. Additional reductions in F will be needed to rebuild lobster stock abundance. The Commission has asked the states to convene the applicable LCMTs (areas 2-6) to develop proposals for F reduction strategies. The proposals and draft addendum XI will be considered by the ASMFC lobster board in October of 2006 for possible implementation in 2007.

The ASMFC coast wide lobster stock assessment (ASMFC 2006a) estimated fishing mortality rates through the 2003 fishing year. The lobster fishing year is defined as October 2003 to September 2004. The assessment working group used a mean 2001-2003 value to characterize F rate in relation to a threshold reference F to determine over fishing status. The estimate is now obsolete and does not reflect conditions and circumstances occurring from 2004-2006. In particular, there is strong evidence for area 2 that abundance is increasing, fishing effort has declined, and that egg production has been increased. Area 2 includes Massachusetts waters south and west of Cape Cod and all Rhode Island state waters. A v-notching program, begun in year 2000 to offset the acute

mortality occurring in 1996 as a result of the North Cape oil spill in Rhode Island Sound, has dramatically changed the population dynamics of female lobster. The program was concluded in July of 2006 with over 1.2 million female lobsters removed from the commercial catch, v-notched, and returned to the local population. A prohibition on the retention of v-notch females has prolonged the lifespan of these animals. Recent action by the Rhode Island and Massachusetts marine fishery agencies to tighten v-notch definitions has provided extended protection to the pool of v-notchers. Both states reduced their v-notch measure from ¼" to 1/8". This paper examines the reduction in fishing mortality in area 2 that has occurred as a result of the v-notch program.

Methods and Data Sources-

North Cape V-Notch Program- The lobster v-notching program was begun in 2000 as a means to replace the 9 million lobster killed during the 1996 North Cape oil spill in Rhode Island Sound. Under the court-approved consent decree governing ecological damage remediation, the responsible party was required to v-notch and release 1.24 million lobsters. Documentation of the extent of the loss and the equivalent adult analyses can be found in Gibson et al. (1997a, 1997b). Details of the demographic calculations linking spill losses to egg production by v-notch females can be found in Gibson (1998) and French et al. (2003). V-notching began in Rhode Island waters in 2000 but was expanded to include Massachusetts waters south and west of Cape Cod in 2004. In year 2000, the first year of the program, lobsters for v-notching were procured from local lobster dealers under the stipulation that they had been caught in the inshore area. Because of documented irregularities in this program with respect to source of the lobsters and the lack of performance by said lobsters as evidenced by independent fishery monitoring data, the program was modified in 2001 to procure and notch lobster directly onboard fishing vessels. On board observers were in place to document the process. Only hard shell female lobsters in good condition were utilized. This was an important quality control element given the local outbreak of shell disease that began in 1997 and peaked in 2002 with over 30% of all animals infected. Notching efforts typically began in May and continued through December. The program met the consent decree release number in July of 2006 and was terminated. A summary of numbers officially notched is given in Table 1. The summary includes a cumulative total which takes account of a natural mortality rate of M=0.15 per year.

Sea Sampling Program- The Division of Fish and Wildlife (DFW) performs sea sampling on inshore lobster boats fishing in Rhode Island waters as well as federal waters of lobster management area 2. Two sampling trips are conducted each month for a total of 24 per year. Data collected include the size composition of the commercial catch as well as effort expended in making the catch. Biological sampling includes observations on sex, maturity, disease, cull status, and presence of v-notches. The program was begun in 1991 and is entirely independent of the v-notching program. As such, it provides an unbiased estimate of the ratio of marked to unmarked females in the population. Sample data on commercial lobster catches from this program for 1991 to 2006 is given in Table 2 by sex and category. The 2006 data is through August only. For further analysis, these

data were converted to catch per unit effort (CPUE) indices by dividing the number of lobsters sampled in each category by the number of traps hauled.

Trawl Surveys- DFW conducts several trawl surveys in Rhode Island state waters. A seasonal, random-stratified survey is conducted in spring and fall in Narragansett Bay, Rhode Island Sound, and Block Island Sound. Stratification is done by depth and area. The spring cruise is conducted in April and May while the fall cruise is conducted in September and October. A total of 42 tows are made per cruise (84 per year). The seasonal survey has been conducted since 1979. In 1990, a monthly cruise at 13 fixed stations in Narragansett Bay was added to provide better resolution of the seasonal changes in Bay resource abundance and diversity. A "summer" index of lobster abundance has been calculated using the months of May through August (52 tows). The summer period is one of high lobster abundance and biological activity. In all surveys, lobster caught are sexed, measured, and characterized by reproductive status. The University of Rhode Island Graduate School of Oceanography (URIGSO) also conducts a trawl survey in Narragansett Bay. Two stations in the west passage of the Bay are sampled every week (104 tows). Although limited in spatial coverage, the survey has been conducted since 1959 providing a long-term perspective on lobster abundance. Trawl abundance indices for sexes combined by size group are summarized in Table 3.

Commercial Trap Catchability and Female Population Size- The introduction into the local population of known numbers of marked (v-notched) animals and the independent recovery of marked and unmarked animals by the sea sample survey provide the basis to estimate the catchability coefficient (q) of the commercial trap gear. By fisheries convention, CPUE is related to absolute abundance through a catchability coefficient:

$$CPUE_t = qN_t \qquad (1)$$

where: CPUE= catch per unit effort during time t
N= mean abundance during t
q= catchability coefficient
t=year.

Ordinarily, CPUE has been estimated via survey and N is unknown so that a combination of observation and process models with catch data as the scaling quantity are used to estimate N (aka "the assessment"). In the case of v-notching, the number of lobster notched and released is known and CPUE has been estimated independently via sea sampling. Therefore, a regression through the origin of annual v-notch CPUE on cumulative N has a slope equal to the catchability coefficient (q). Eq.1 is the fundamental basis for the Schumacher-Eschmeyer regression method for estimating population size from marked individuals as described in Seber (1982). With an estimate of q in hand and an assumption that the other classes of lobster (marketable, eggers, shorts, males) have equal q as the v-notchers, absolute estimates of population size can be made via re-arrangement of eq.1.

Mass-Balance Estimates of Fishing Mortality Rate- The ASMFC lobster stock assessment committee pioneered the use of "mass-balance" methods to estimate mortality rate independent of landings data (ASMFC 2000). While they focused on trawl survey data, the method can be applied to any estimates of abundance by size class. The basic mass-balance equation is:

$$F_t = -\ln[N_{t+1}/(N_t+(pR)_t/s)]-M_t \qquad (2)$$

where:
F= fishing mortality rate
N= abundance of legal size lobster
R= abundance of sub legal size lobster
p=proportion sublegals molting to legal size
s= selectivity of sublegals relative to legals
M= the natural mortality rate.
t= year.

Recruit lobster are those one molt below legal size. For the purpose of this study, p was assumed to be 0.75 for sub legal females since one- half of them are mature and molt every two years while one-half are immature and on an annual molt cycle. The probability of molting in males was set to 1.0 as all molt each year. M was assumed to be 0.15 per year. I also assumed that sub legal selectivity for males and females is 1.0. The implication of deviations from these assumptions is discussed later. Estimates of N and R were taken from the catchability-sea sample CPUE analysis above.

Maximum Exploitation Rate- The mass-balance approach above relies in part on assumptions about sub legal lobster catchability as well as molt probability. It is possible to avoid these assumptions and consider only the legal female population components identified in the sea sampling. Total female legal population size is equal to the total legal female CPUE divided by the estimated catchability coefficient. The portion of the female population size vulnerable to fishing (marketable class) can be similarly calculated. The ratio of marketable population size to total legal female population size is the maximum exploitation rate possible given that all marketable animals are caught during the year. Although this is unlikely, the calculation bounds the possible range of F. Exploitation rate (u) can be converted to F given M by iterative solution of:

$$u= [F*(1-\exp(-(F+M))]/(F+M) \qquad (3).$$

This calculation cannot be done for males, as there are no legal size classes protected from fishing.

Trawl Survey Estimates of F- A reduction in fishing mortality rate evident in commercial sea sample based estimates of female population size should be verifiable with fishery independent trawl survey data. Fisheries scientists are generally concerned that fishery dependent CPUE may display hyper-stability in the face of true abundance change. In this case, the q parameter in eq.1 might not be constant but could change with respect to

time or lobster abundance. There is also a concern that increases in escape vent size for commercial traps may have decreased the catchability of sub legal lobster over time. Neither hyper stability nor changing catchability is likely for research trawl surveys that contain random design elements and are executed using standard methods and gear. Accordingly, estimates of F were computed using eq.2 applied to trawl survey data from the four DFW and URIGSO surveys. The estimates were made from data with sexes combined and may overestimate of the mortality rate on the female component of the stock. Natural mortality rate was set to M=0.15 and recruit selectivity to q=1.0.

Results-

Abundance and Fishing Mortality Rate- The number of v-notched lobsters observed in DFW sea sampling increased sharply from 2000 to 2005 as the v-notching program ran its course (Tables 1,2). The correlation between sea sample CPUE of v-notch lobster and the cumulative number v-notched and released by the responsible party was very strong (Figure 1). The regression estimate of the catchability coefficient was 9.09E-07 with a SE of 7.28E-08 (Table 4). The coefficient of variation for the parameter was 0.08 indicating a precise estimate. Estimates of absolute lobster abundance by category are given in Table 5. The abundance of v-notch and egg bearing legal females has increased substantially in recent years while the abundance of marketable females has declined (Figure 2a). Sub legal female abundance was relatively high from 1991 to 2000 but declined to a low point in 2002. It has since increased although not to former levels. Abundance for both legal and sublegal males has trended downward since 1995 (Figure 2b). Both the mass-balance and maximum exploitation rate methods show a sharp decline in female F from 2000 to 2005 coincident to large-scale v notching of females (Figure 3). Mean mass-balance F for females was 1.12 from 1996-2001 while the mean F from 2002-2005 was only 0.44, a 61% decrease. Mass-balance estimates of F for males showed no downward trend and have averaged 0.85 since 1991. The divergence between male and female F is noteworthy since 2001.

Mass-balance estimates of F derived from trawl survey data are given in Table 6. The estimates are associated with the first year of the data pair so for instance the fall 1979 estimate represents F from October of 1979 to September of 1980. Although noisy and showing occasional negative values, the survey data confirm the reduction in females F estimated through sea sampling even though sexes are combined. All surveys show a period of high F from 1997 to 2001 followed by a noticeable decline (Figure 4). Mean F was 1.70 from 1997-2002 while the mean F from 2002-2005 was only 0.62, a 63% decrease. The reduction in F is associated with a recent increase in lobster abundance in all trawl surveys (Figure 5). This increase includes legal size animals (Table 3).

Sensitivity Analyses- Estimation of the commercial pot catchability coefficient is dependent on the assumed rate of natural mortality (M=0.15) used to correct the cumulative v-notch total for annual losses. The M=0.15 value was the standard assumption in ASMFC (2000) but was reconsidered in the ASMFC (2006a) stock assessment based on documented outbreaks of shell disease and mass die-offs in the SNE stock area. M Values as high as 0.65 were considered possible for recent years.

Accordingly, commercial pot catchability and fishing mortality rate were re-estimated using M=0.65. The estimate of catchability increased to 1.43E-06 and precision declined (CV=0.15). Variance explained by the regression of v-notch CPUE on cumulative number released dropped from 91% to 71%. This suggests that a high M is not appropriate for hard-shell females v-notched in healthy condition. More importantly, the sharp decline in estimated F rate after 2000 is preserved even with high M although the negative F values in recent years are further evidence that high M is unlikely (Figure 6).

The mass-balance method when applied to fishery dependent data is heavily reliant on the assumption that the estimated catchability coefficient is applicable to all classes of lobster including sublegals. Sub legal catch in commercial pot gear is dominated by animals in the 73-82 mm molt group. This is the size group most likely to benefit from escape vents in commercial pots. Technically, it is not necessary for s in eq.2 to equal 1.0 in order to detect a decline in F but the scale of F may be changed. Figure 7 shows the female F pattern with recruit selectivity set to ½ the value for legals. The strong decline post 2000 is preserved although the scale of F is increased. More important is the possibility that recruit selectivity has declined over time owing to increases in escape vent size. Regulatory actions have increased escape vent size from 1 5/8" in 1991 to 2" in 2005. This could induce an artifactual decline in F in recent years by progressive underestimation of recruits. Examination of the ratio of recruits to legal size lobsters in trawl gear and commercial pots indicates that this is not likely. Females in pots show a pronounced drop in the ratio of recruits to legals in recent years (Figure 8). This is not evident for males in pots indicating that decreased selectivity of recruits is not the explanation. Moreover, the reduction in recruit per legal ratio is evident in the trawl gear for sexes combined. Changes in recruit selectivity are unlikely in the trawl gear because of the standardized nature of the survey and gear. It is more likely that these patterns truly reflect an increase in abundance of female legal lobster relative to recruits, which is of course a mortality reduction.

It should be evident in eq.2 that molt probability like selectivity, will act as a scaler for fishing rate for values of p held constant from 1991-2006 so that the recent reduction in F would be preserved, albeit scaled. It is possible however for temporal changes in p to interact with temporal changes in selectivity to bias estimates of F made with constant values. The most likely scenario is declining s with time due to increases in escape vent sizes and p declining with time based on tag-recapture data for lobsters tagged at Millstone Station, CT (molt probabilities from CTDEP). To examine this possibility, a sensitivity run was configured with selectivity declining from 1.0 to 0.25 and molt probability declining from 0.75 to 0.25 over the period 1991-2006. Results indicated that a reduction in fishing mortality would still be evident under these conditions (Figure 9). Declining s and p are offsetting biases that tend to neutralize one another.

Discussion-

The southern New England lobster stock, including that in Rhode Island and Massachusetts waters, underwent a major decline in abundance (ASMFC 2006a). Recommendations were made to reduce fishing mortality (ASMFC 2006b) and the

ASMFC lobster management board responded by authorizing development of Addendum XI. This action will implement fishing mortality reduction measures. The applicable LCMTs have been convened to propose measures to achieve a 10% reduction in F over the mean 2001-2003 levels most recently assessed. It was the position of the area 2 LCMT at their September 13th meeting that this level of mortality reduction had already been achieved through measures and programs implemented since 2004. This paper provides a quantitative confirmation of that view.

Parallel evidence from fishery dependent monitoring and fishery independent trawl survey shows that fishing mortality rate on female lobster in area 2 has been substantially reduced from 2001-2005. This conclusion is independent of landings data, the assembly of which delays provision of stock status advice. The reduction is most likely due to the large-scale v-notching program undertaken to replace animals killed in the North Cape oil spill. Although v-notching of legal females by the responsible party ceased in July of 2006, Rhode Island and Massachusetts have acted to extend the lifespan of these females by adopting a more protective v-notch definition that further delays harvest. In addition, a segment of industry continues to re-notch lobsters caught bearing regenerating notches. It is not yet known how widespread this practice is but it is quantifiable through continued sea sampling by RIDFW and MADMF. Figure 1 provides the basis to estimate female population size by category from which mortality rates can be tracked (eq.2). These estimates can be corroborated by trawl survey.

The Rhode Island inshore lobster fishery has undergone great attrition since the area 2 collapse. Estimates of pots fished, trap tags ordered, and lobster licenses issued have all declined (Figure 10). Although the relationship between F rate and effort measures is difficult to quantify, the trends are promising in view of the Addendum VII objective to cap fishing effort. A plot of F rates from this study vs. traps deployed suggests that some type of saturating function underlies the relationship (Figure 11). Since the relationship must pass through the origin, it may be that much of the saturation effect has been overcome by attrition. Once historical participation is implemented in area 2 and augmented with transferability provisions that require a transaction tax, it is expected that further reductions in effort will occur. Figure 11 suggests that further reductions below the 80,000 pot level that existed in 2005 will move the system into the domain where fishing mortality rate is proportional to pot deployment.

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Table 1- Summary of the North Cape Female Lobster V-Notching Program

Year	Number /1 Notched	Cumulative Number /2 Notched
2000	100000	100000
2001	37659	123730
2002	211105	317600
2003	123356	396717
2004	240292	581750
2005	411566	912282
2006	42000	827209

/1
The responsible party reported 299,000 notched in 2000. This number was reduced to 100,000 based on documented irregularities in the procurement process and low abundance of v-notch lobster in DFW sea sampling in 2000.
/2
Assumes a natural mortality rate of M=0.15 per year

Table 2- RIDFW Sea Sampling Data for Lobster in Area 2, 1991-2006 /1
Number of Lobster Sampled by Category and Traps Hauled

YEAR	Market Females	Legal Eggers No vnotch	Legal Vnotch	Legal Vnotch Eggers	New Vnotch	Sublegal Female	Sublegal Eggers	Market Males	Sublegal Males	Traps Hauled
1991	4965	785	0	0	0	11119	3388	4052	5820	8190
1992	2516	474	0	0	0	5743	2244	1787	2912	5947
1993	2694	312	0	0	0	5364	2674	2092	2766	6031
1994	2835	177	0	0	0	6144	1709	2400	3132	6152
1995	3954	365	0	0	0	7919	3195	3313	5011	7086
1996	3732	304	0	0	0	10423	2719	2884	5866	7028
1997	3467	286	0	0	0	6867	2866	2650	3560	7126
1998	2815	511	0	0	0	7362	3927	1949	3371	6402
1999	2950	423	0	0	0	6849	4812	2540	3696	7398
2000	2060	319	599	54	0	5493	3252	2334	3213	6340
2001	1701	280	344	74	1	5058	2330	1549	2915	6703
2002	1161	349	624	525	240	2631	2143	1436	1831	6245
2003	1239	247	1284	681	354	4382	2079	1359	2639	6414
2004	869	271	1238	932	161	3133	2446	1190	2179	6170
2005	865	341	4173	2133	669	3959	2879	1355	2266	7060
2006	519	202	1698	1062	152	2393	1109	701	979	3143

/1
2006 is through August Only

Table 3- Lobster Abundance Indices by Size Class from the RIDFW and URIGSO Trawl Surveys

Year	Spring Prerecruits	Spring Recruits	Spring Legals	Spring All	Fall Prerecruits	Fall Recruits	Fall Legals	Fall All	Summer Prerecruits	Summer Recruits	Summer Legals	Summer All	URIGSO Prerecruits	URIGSO Recruits	URIGSO Legals	URIGSO All
1979	0.37	0.12	0.07	0.56	1.79	0.61	0.22	2.62					1.68	0.28	0.22	2.17
1980	0.50	0.16	0.06	0.71	3.85	0.80	0.23	4.88					1.19	0.21	0.08	1.47
1981	3.47	0.87	0.09	4.43	8.52	1.51	0.23	10.26					4.71	0.63	0.06	5.41
1982	1.24	0.48	0.17	1.89	1.82	0.66	0.12	2.61					3.93	1.21	0.18	5.31
1983	1.42	1.03	0.30	2.75	1.21	0.41	0.26	1.88					1.30	0.61	0.19	2.11
1984	4.29	1.28	0.65	6.22	6.32	1.40	0.42	8.15					2.58	0.45	0.16	3.19
1985	2.59	0.49	0.23	3.31	4.63	1.00	0.27	5.90					4.41	0.64	0.21	5.26
1986	2.98	0.94	0.24	4.16	4.26	1.19	0.29	5.74					5.33	1.13	0.22	6.67
1987	3.33	0.94	0.31	4.58	8.31	2.88	0.63	11.82					6.26	1.65	0.31	8.22
1988	0.60	0.46	0.20	1.26	8.39	2.54	0.85	11.79					9.72	2.66	0.64	13.02
1989	8.33	2.08	0.69	11.09	9.95	3.07	0.70	13.71					20.12	5.05	0.72	25.89
1990	17.89	4.04	0.90	22.82	7.49	2.50	0.89	10.88	12.06	4.07	1.13	17.26	19.31	5.95	1.52	26.78
1991	9.55	3.51	1.15	14.21	10.85	2.95	0.90	14.69	11.58	4.77	1.68	18.02	16.22	5.71	1.69	23.62
1992	2.99	1.28	0.49	4.76	7.87	1.72	0.89	10.49	10.16	2.92	0.76	13.85	21.19	6.13	1.60	28.91
1993	4.81	1.44	0.71	6.96	17.84	7.23	2.76	27.82	18.06	8.17	1.83	28.06	16.20	6.85	1.58	24.64
1994	3.48	1.88	0.48	5.84	16.80	3.75	1.40	21.95	14.49	2.99	0.86	18.34	17.09	3.49	1.04	21.62
1995	4.41	1.99	0.57	6.97	11.30	3.87	0.99	16.17	16.16	5.24	1.77	23.17	19.22	6.24	1.82	27.29
1996	8.06	3.33	1.39	12.77	13.29	5.59	1.82	20.70	12.22	5.22	1.13	18.57	34.99	15.14	3.11	53.25
1997	8.39	3.29	0.99	12.67	12.46	5.43	2.09	19.98	8.80	3.87	1.04	13.70	23.49	10.06	2.44	36.00
1998	4.44	1.78	0.39	6.61	7.24	3.10	0.31	10.64	8.20	4.04	1.17	13.41	21.50	9.77	2.53	33.80
1999	3.25	2.01	0.33	5.59	4.68	1.88	0.46	7.02	5.43	2.88	0.69	8.99	12.95	6.27	1.51	20.74
2000	2.32	1.54	0.42	4.28	3.40	1.75	0.40	5.55	4.78	2.46	0.62	7.85	9.52	4.90	1.26	15.67
2001	4.42	1.47	0.28	6.18	6.00	2.00	0.21	8.21	4.22	2.31	0.74	7.26	8.87	3.82	0.97	13.66
2002	4.38	2.00	0.34	6.73	1.28	0.83	0.03	2.13	2.32	1.05	0.32	3.69	7.02	3.26	0.72	10.99
2003	0.96	0.57	0.14	1.67	2.76	1.00	0.57	4.33	2.50	1.45	0.55	4.50	3.59	1.89	0.76	6.25
2004	1.78	1.78	0.78	4.34	2.10	1.67	0.48	4.24	3.58	3.31	1.97	8.86	3.33	3.02	1.65	8.01
2005	2.66	1.68	0.49	4.84	10.00	2.10	0.50	12.60	5.53	3.57	2.48	11.58	5.61	2.76	1.73	10.10
2006	5.60	2.53	0.98	9.11					7.11	4.70	2.45	14.26	7.00	4.11	2.00	13.12

Table 4- SUMMARY OUTPUT for Regression of V-notch CPUE on Cumulative Number Notched Regression was Constrained to an Intercept Eqaul to Zero

Regression Statistics	
Multiple R	0.952441
R Square	0.907145
Adjusted R S	0.740478
Standard Err	0.106419
Observations	7

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regression	1	0.6638271	0.66382712	58.61655003	0.000605
Residual	6	0.0679495	0.01132491		
Total	7	0.7317766			

	Coefficients	*tandard Erro*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	CV
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	

Table 5- Estimates of Absolute Abundance for Area 2 Lobster

	Millions Legal Females				Millions Sublegals Females			Millions Males		
	Market	Eggers	V-notch	Total	Barren	Egger	Total	Market	Sublegal	Grand tot
1991	0.66	0.10	0.00	0.77	1.48	0.45	1.93	0.54	0.78	4.02
1992	0.46	0.09	0.00	0.55	1.05	0.41	1.47	0.33	0.53	2.88
1993	0.49	0.06	0.00	0.54	0.97	0.48	1.45	0.38	0.50	2.88
1994	0.50	0.03	0.00	0.53	1.09	0.30	1.39	0.43	0.56	2.91
1995	0.61	0.06	0.00	0.67	1.22	0.49	1.71	0.51	0.77	3.66
1996	0.58	0.05	0.00	0.63	1.62	0.42	2.04	0.45	0.91	4.03
1997	0.53	0.04	0.00	0.57	1.05	0.44	1.49	0.41	0.55	3.02
1998	0.48	0.09	0.00	0.57	1.26	0.67	1.92	0.33	0.57	3.40
1999	0.44	0.06	0.00	0.50	1.01	0.71	1.72	0.37	0.55	3.14
2000	0.35	0.06	0.11	0.52	0.95	0.56	1.51	0.40	0.55	2.98
2001	0.28	0.06	0.07	0.39	0.82	0.38	1.20	0.25	0.47	2.32
2002	0.24	0.15	0.20	0.51	0.46	0.37	0.83	0.25	0.32	1.91
2003	0.27	0.16	0.33	0.65	0.75	0.35	1.10	0.23	0.45	2.43
2004	0.18	0.21	0.38	0.61	0.55	0.43	0.99	0.21	0.39	2.20

Table 6- Mass-Balance Estimates of F from Trawl Survey Data

Year	Spring Seasonal	Fall Seasonal	Summer NarrBay	URIGSO Annual	Mean
1979	0.77	0.95		1.56	1.09
1980	0.54	1.11		1.16	0.94
1981	1.33	2.25		0.95	1.51
1982	0.40	0.72		1.57	0.90
1983	0.36	0.15		1.26	0.59
1984	1.80	1.54		0.71	1.35
1985	0.76	1.12		0.99	0.96
1986	0.97	0.48		1.08	0.84
1987	1.48	1.04		0.73	1.08
1988	-0.39	1.23		1.14	0.66
1989	0.77	1.07		0.94	0.92
1990	1.08	0.97	0.76	1.11	0.98
1991	1.89	1.10	1.78	1.17	1.48
1992	0.57	-0.38	0.33	1.21	0.43
1993	1.16	1.61	2.07	1.72	1.64
1994	1.05	1.29	0.41	0.55	0.83
1995	0.24	0.61	1.47	0.59	0.73
1996	1.22	0.91	1.43	1.63	1.30
1997	2.03	2.84	1.06	1.22	1.79
1998	1.49	1.59	1.65	1.72	1.61
1999	1.32	1.39	1.38	1.45	1.39
2000	1.58	1.93	1.05	1.47	1.51
2001	1.25	4.08	1.89	1.52	2.19
2002	2.41	-0.03	0.55	1.28	1.05
2003	-0.46	0.87	-0.34	0.13	0.05
2004	1.31	1.09	0.44	0.67	0.88
2005	0.43		0.59	0.49	0.50

Fig.1- V-Notch CPUE in DFW Area 2 Sea Sampling vs. Cumulative Number Marked by OTF w/ M=0.15

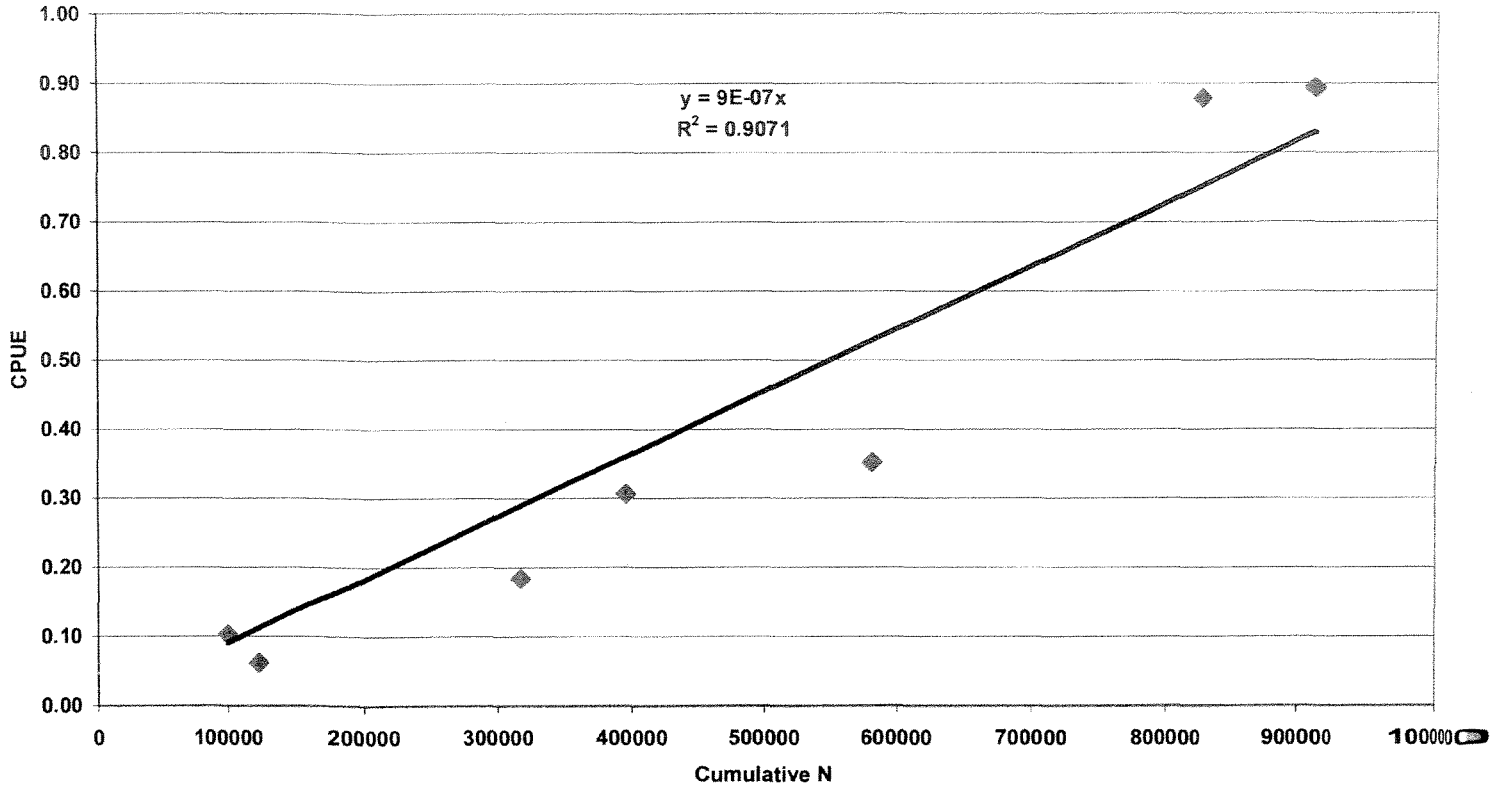


Fig.2a- Estimated Abundance of Female Lobster by Category in Area 2

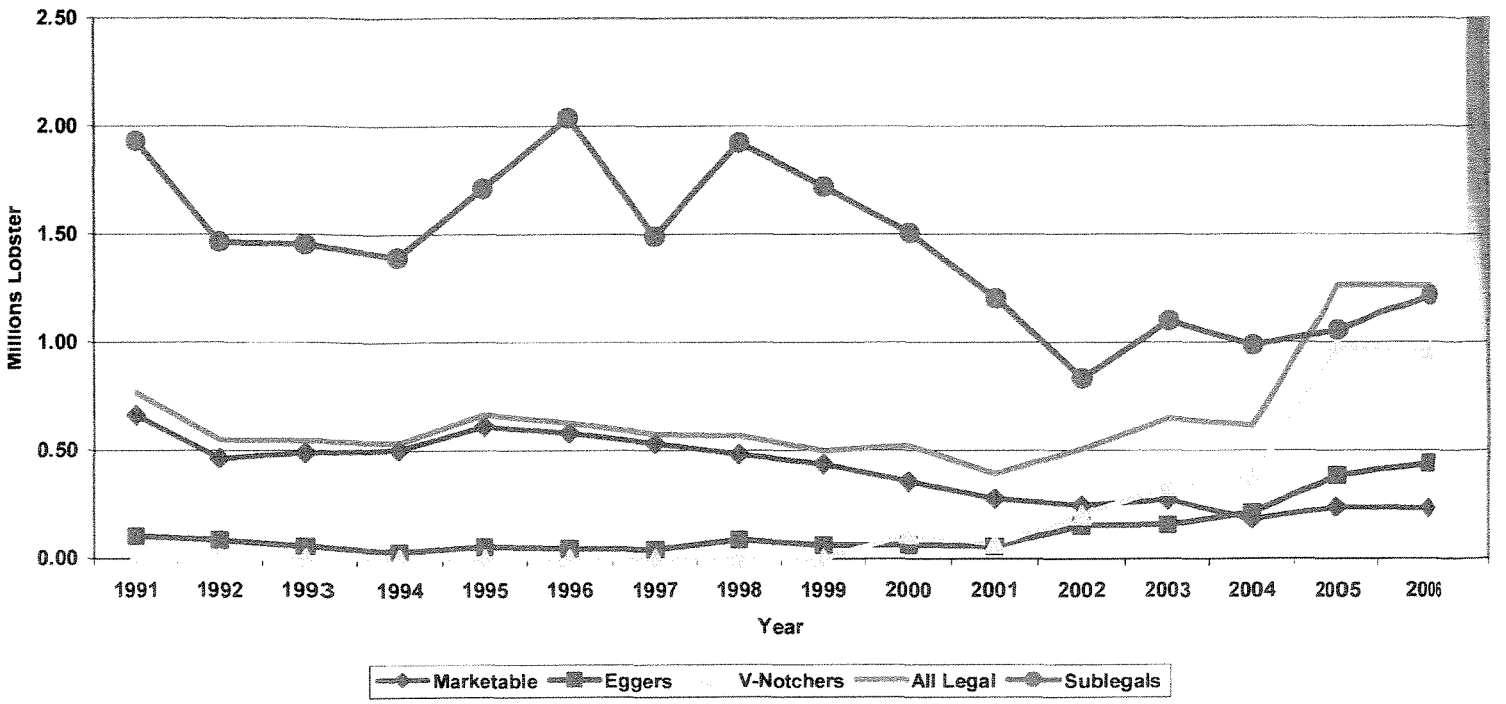


Fig.2b- Estimated Abundance of Male Lobster by Category in Area 2

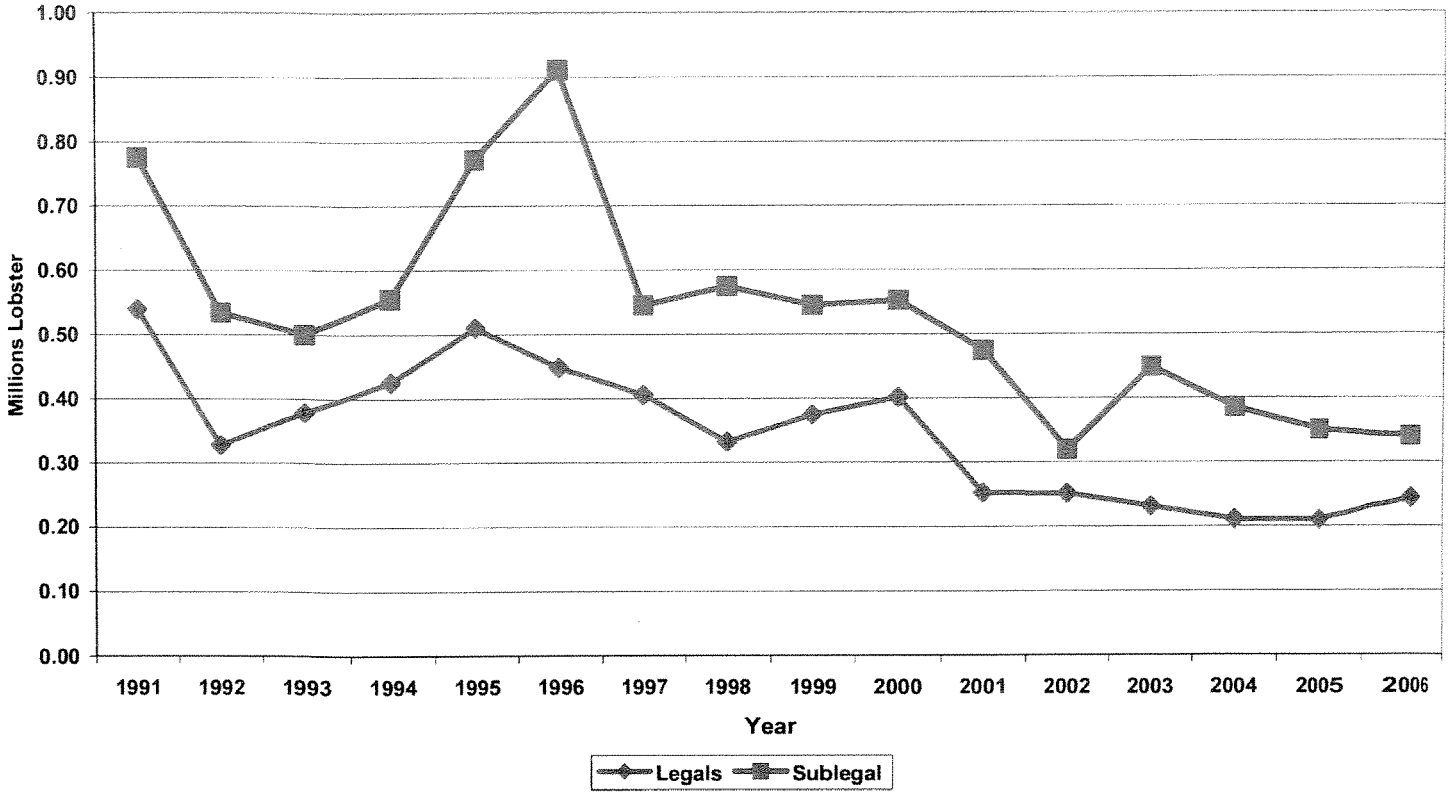


Fig.3- Estimated Fishing Mortality Rate on Female Lobster in Area 2 from Fishery Dependent Data

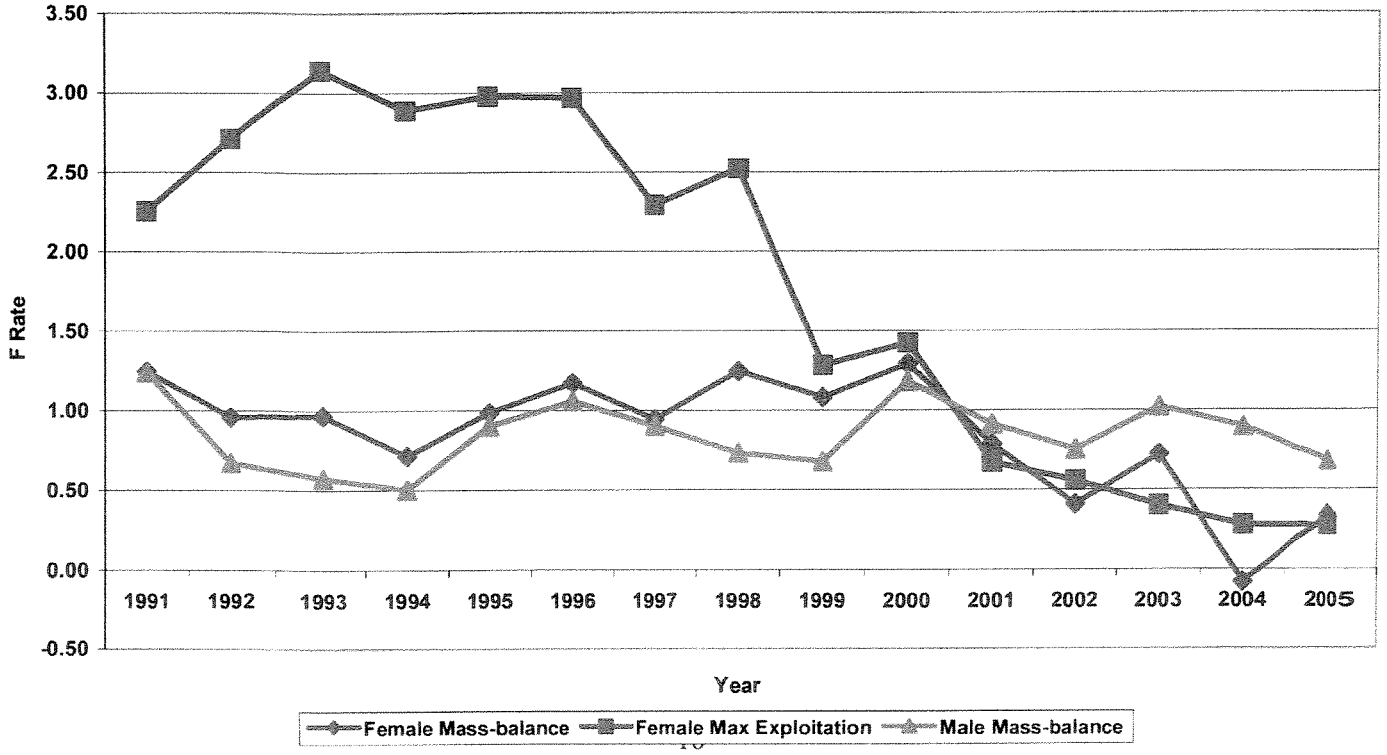


Fig.4- Fishing Mortality Rate on Lobster in Rhode Island from Trawl Survey Data

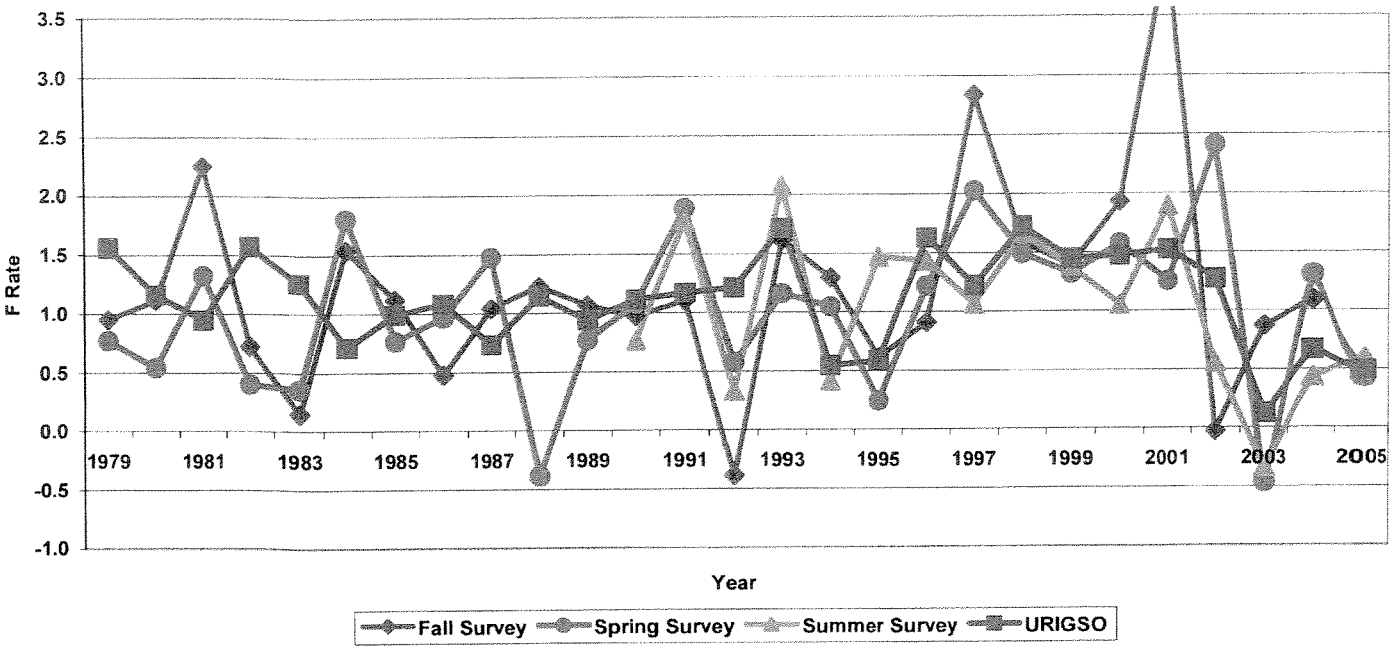


Fig.5- Lobster Abundance in the RIDFW and URIGSO Trawl Surveys

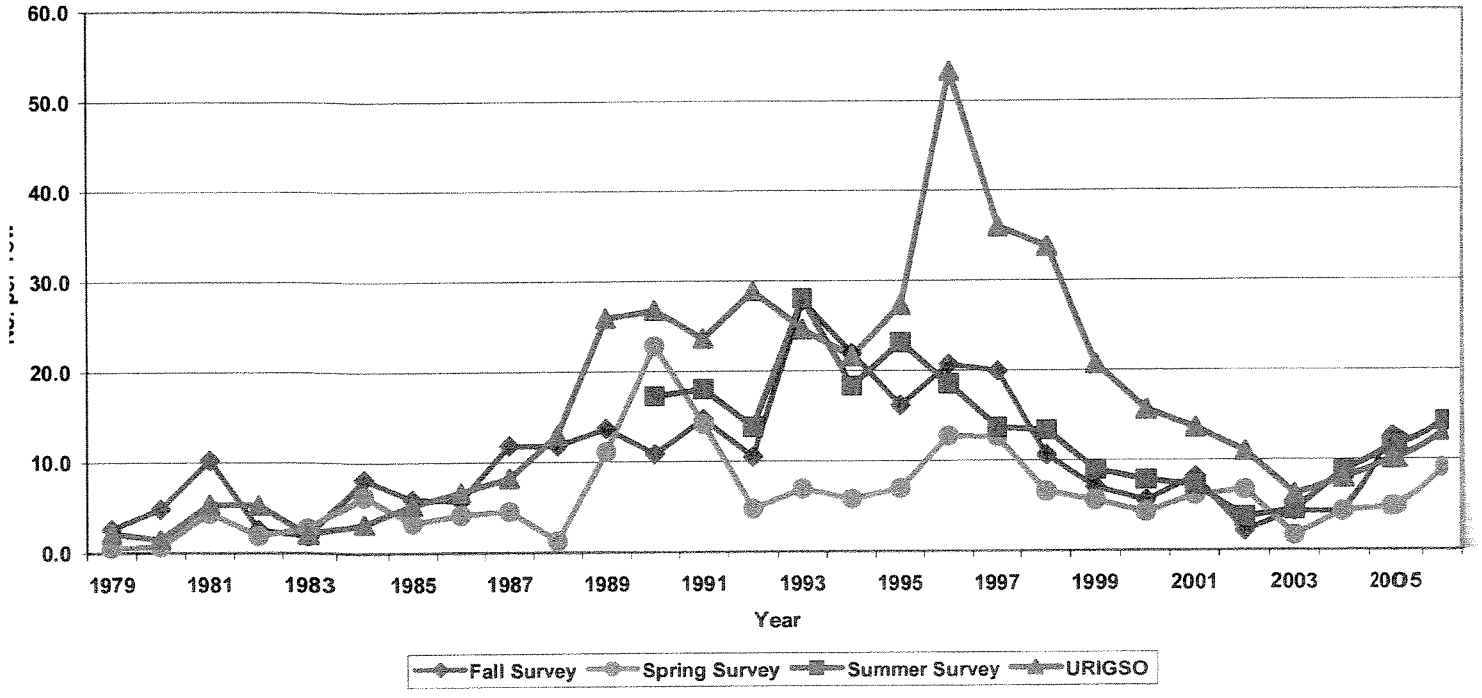


Fig.6- Estimated Fishing Mortality Rate on Female Lobster in Area 2 from Fishery Dependent Data with M=0.65 from 1997-2006

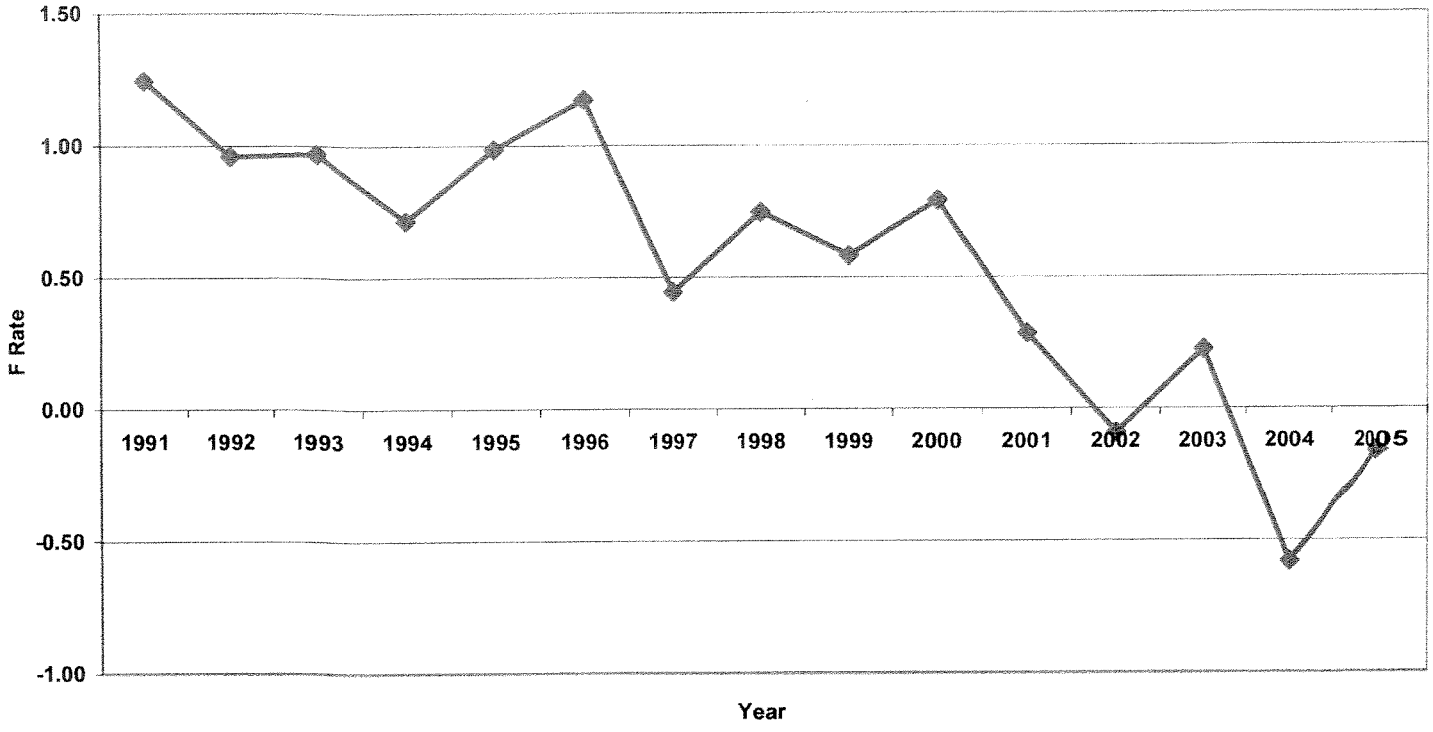


Fig.7- Estimated Fishing Mortality Rate on Female Lobster in Area 2 from Fishery Dependent Data with Recruit Selectivity Set to 0.5

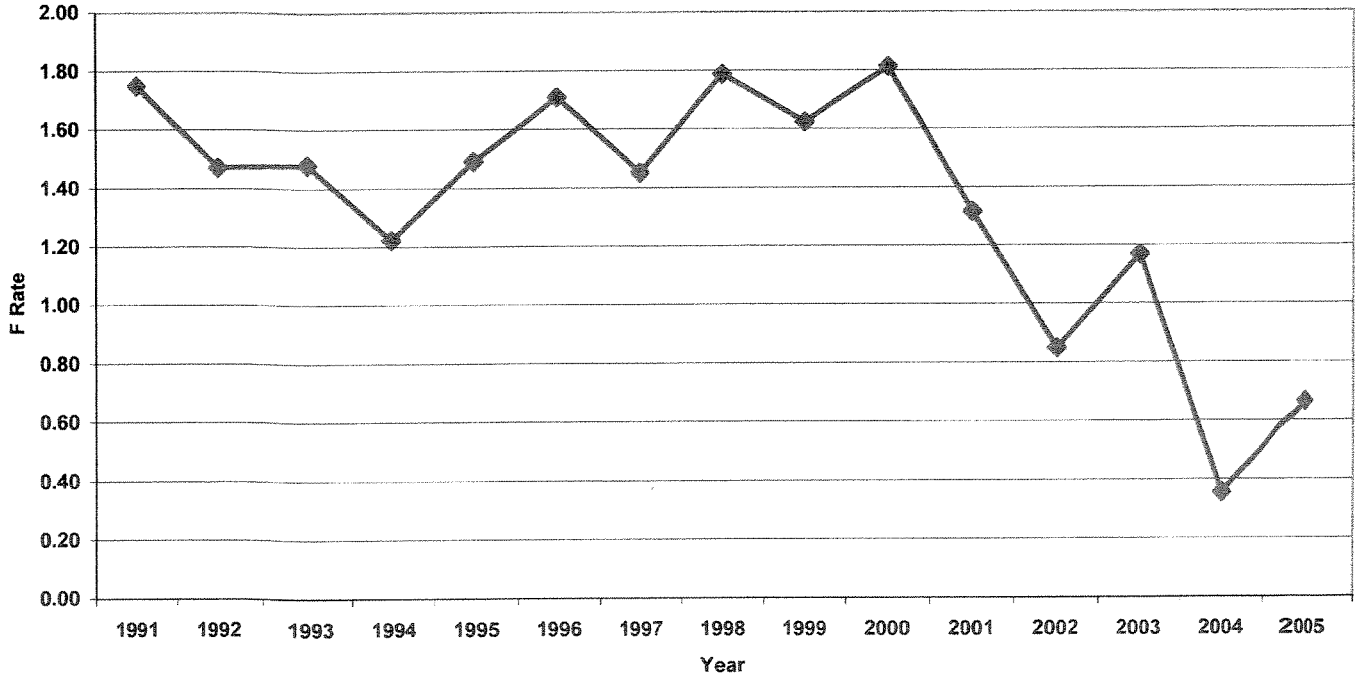


Fig.8- Ratio of Recruit to Legal Lobster in RIDFW Trawl Surveys and Inshore Commercial Sea Samples

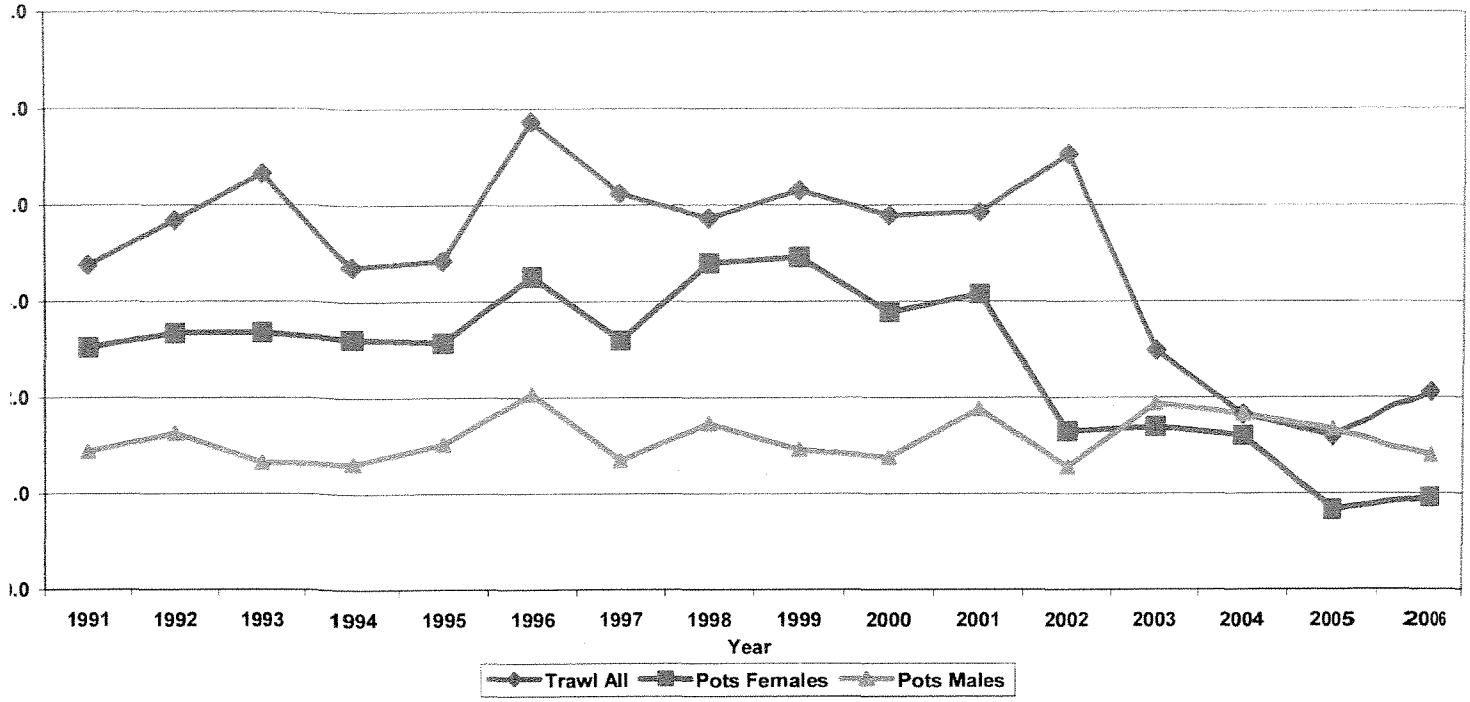


Fig.9- Estimated Fishing Mortality Rate on Female Lobster in Area 2 from Fishery Dependent Data with Trend in Selectivity and Molt Probability

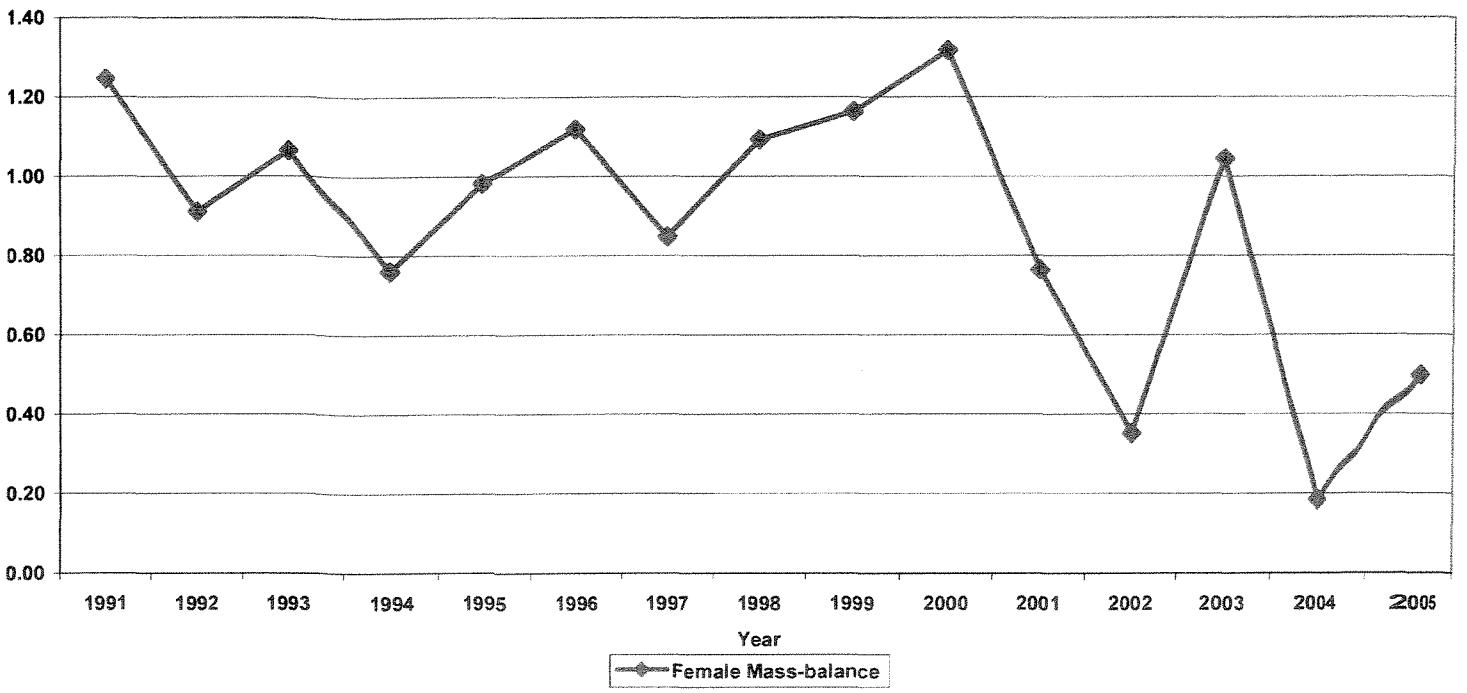


Fig.10- RI Inshore Lobster Fishing Effort Series

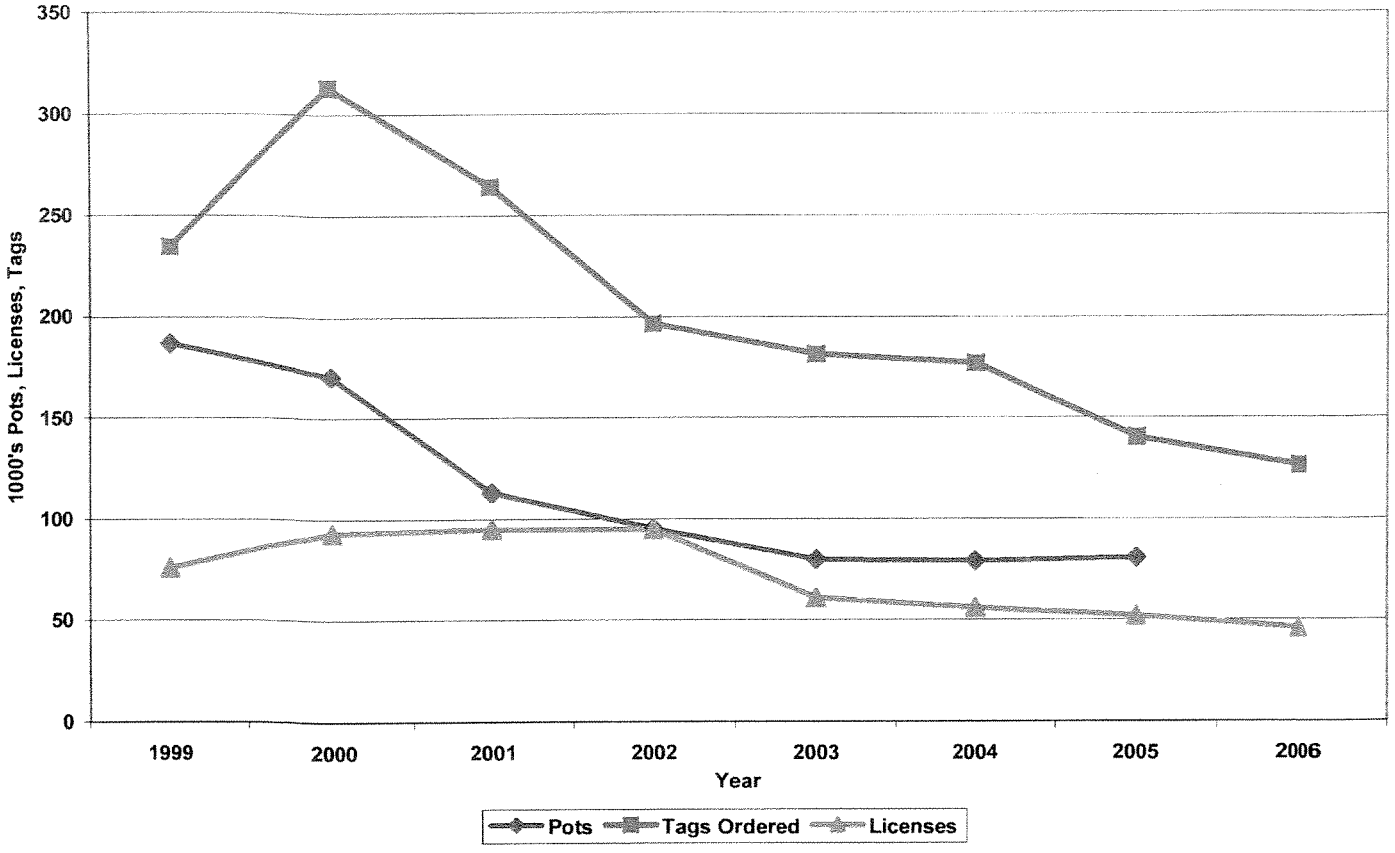
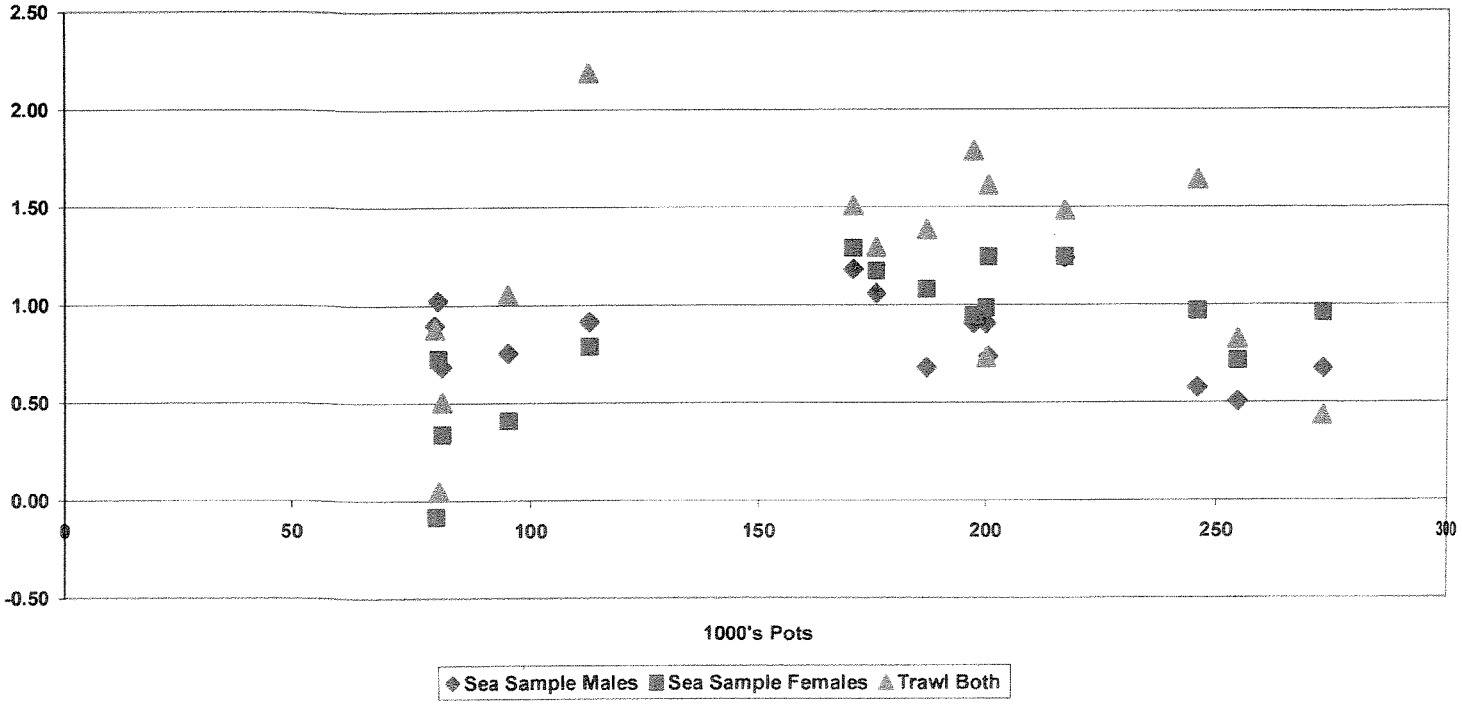
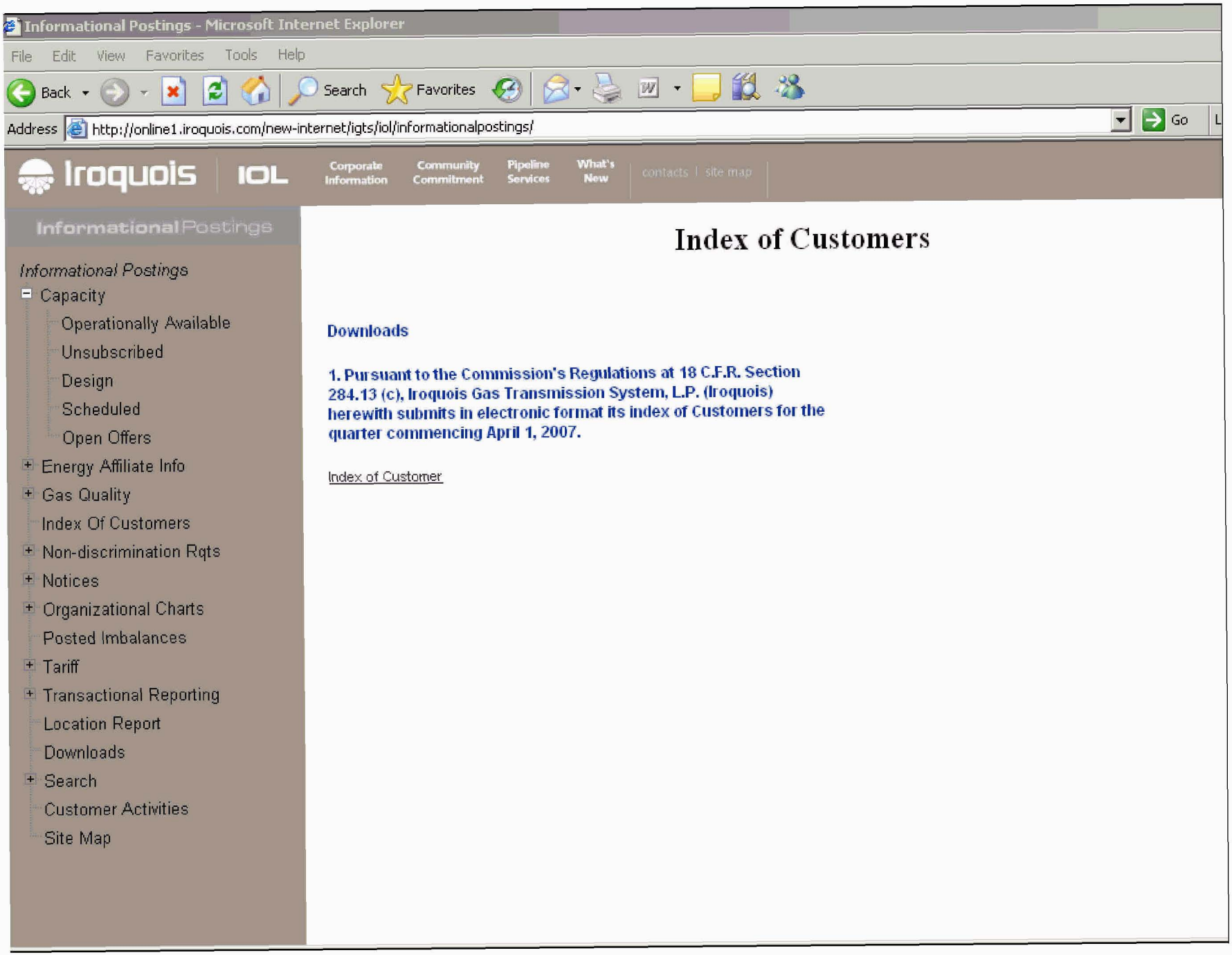


Fig.11- Fishing Mortality Rate on Lobster vs. Number of Pots Fished





constituting public information posted on the pipeline web site:

(A) The documents must be accessible to the public over the public Internet using commercially available web browsers, without imposition of a password or other access requirement;

(B) Users must be able to search an entire document online for selected words, and must be able to copy selected portions of the documents; and

(C) Documents on the web site should be directly downloadable without the need for users to first view the documents on the web site.

(iii) If a pipeline uses a numeric or other designation to represent information, an electronic cross-reference table between the numeric or other designation and the information represented must be available to users, at a cost not to exceed reasonable shipping and handling.

(iv) A pipeline must provide the same content for all information regardless of the electronic format in which it is provided.

(v) A pipeline must maintain, for a period of three years, all information displayed and transactions conducted electronically under this section and be able to recover and regenerate all such electronic information and documents. The pipeline must make this archived information available in electronic form for a reasonable fee.

(vi) A pipeline must post notices of operational flow orders, critical periods, and other critical notices on its Internet web site and must notify affected parties of such notices in either of the following ways to be chosen by the affected party: Internet E-Mail or direct notification to the party's Internet URL address.

[Order 587, 61 FR 39068, July 26, 1996, as amended by Order 587–B, 62 FR 5525, Feb. 6, 1997; Order 587–C, 62 FR 10690, Mar. 10, 1997; Order 587–G, 63 FR 20095, Apr. 23, 1998; Order 587–H, 63 FR 39514, July 23, 1998; Order 587–I, 63 FR 53576, Oct. 6, 1998; Order 587–K, 64 FR 17278, Apr. 9, 1999. Redesignated and amended by Order 637, 65 FR 10220, Feb. 25, 2000; Order 637–A, 65 FR 35765, June 5, 2000; Order 587–M, 65 FR 77290, Dec. 11, 2000; Order 587–N, 67 FR 11916, Mar. 18, 2002; Order 587–O, 67 FR 30794, May 8, 2002; Order No. 587–R, 68 FR 13819, Mar. 21, 2003; 69 FR 18803, Apr. 9, 2004; Order 587–S, 70 FR 28210, May 17, 2005]

§284.13 Reporting requirements for interstate pipelines.

An interstate pipeline that provides transportation service under subparts B or G of this part must comply with the following reporting requirements.

(a) Cross references. The pipeline must comply with the requirements in Part 358, Part 250, and Part 260 of this chapter, where applicable.

(b) Reports on firm and interruptible services. An interstate pipeline must post the following information on its Internet web site, and provide the information in downloadable file formats, in conformity with §284.12 of this part, and must maintain access to that information for a period not less than 90 days from the date of posting.

(1) For pipeline firm service and for release transactions under §284.8, the pipeline must post with respect to each contract, or revision of a contract for service, the following information no later than the first nomination under a transaction:

(i) The full legal name of the shipper, and identification number, of the shipper receiving service under the contract, and the full legal name, and identification number, of the releasing shipper if a capacity release is involved or an indication that the pipeline is the seller of transportation capacity;

(ii) The contract number for the shipper receiving service under the contract, and, in addition, for released transactions, the contract number of the releasing shipper's contract;

(iii) The rate charged under each contract;

(iv) The maximum rate, and for capacity release transactions not subject to a maximum rate, the maximum rate that would be applicable to a comparable sale of pipeline services;

(v) The duration of the contract;

(vi) The receipt and delivery points and zones or segments covered by the contract, including the industry common code for each point, zone, or segment;

(vii) The contract quantity or the volumetric quantity under a volumetric release;

(viii) Special terms and conditions applicable to a capacity release transaction, including all aspects in which

the contract deviates from the pipeline's tariff, and special details pertaining to a pipeline transportation contract, including whether the contract is a negotiated rate contract, conditions applicable to a discounted transportation contract, and all aspects in which the contract deviates from the pipeline's tariff.

(ix) Whether there is an affiliate relationship between the pipeline and the shipper or between the releasing and replacement shipper.

(2) For pipeline interruptible service, the pipeline must post on a daily basis no later than the first nomination for service under an interruptible agreement, the following information:

(i) The full legal name, and identification number, of the shipper receiving service;

(ii) The rate charged;

(iii) The maximum rate;

(iv) The receipt and delivery points covered between which the shipper is entitled to transport gas at the rate charged, including the industry common code for each point, zone, or segment;

(v) The quantity of gas the shipper is entitled to transport;

(vi) Special details pertaining to the agreement, including conditions applicable to a discounted transportation contract and all aspects in which the agreement deviates from the pipeline's tariff.

(vii) Whether the shipper is affiliated with the pipeline.

(c) Index of customers. (1) On the first business day of each calendar quarter, an interstate pipeline must file with the Commission an index of all its firm transportation and storage customers under contract as of the first day of the calendar quarter that complies with the requirements set forth by the Commission. The Commission will establish the requirements and format for such filing. The index of customers must also posted on the pipeline's Internet web, in accordance with standards adopted in §284.12 of this part, and made available from the Internet web site in a downloadable format complying with the specifications established by the Commission. The information posted on the pipeline's Internet web site must be made available until the next quarterly index is posted.

(2) For each shipper receiving firm transportation or storage service, the index must include the following information:

(i) The full legal name, and identification number, of the shipper;

(ii) The applicable rate schedule number under which the service is being provided;

(iii) The contract number;

(iv) The effective and expiration dates of the contract;

(v) For transportation service, the maximum daily contract quantity (specify unit of measurement), and for storage service, the maximum storage quantity (specify unit of measurement);

(vi) The receipt and delivery points and the zones or segments covered by the contract in which the capacity is held, including the industry common code for each point, zone, or segment;

(vii) An indication as to whether the contract includes negotiated rates;

(viii) The name of any agent or asset manager managing a shipper's transportation service; and

(ix) Any affiliate relationship between the pipeline and a shipper or between the pipeline and a shipper's asset manager or agent.

(3) The requirements of this section do not apply to contracts which relate solely to the release of capacity under §284.8, unless the release is permanent.

(4) Pipelines that are not required to comply with the index of customers posting and filing requirements of this section must comply with the index of customer requirements applicable to transportation and sales under Part 157 as set forth under §154.111(b) and (c) of this chapter.

(5) The requirements for the electronic index can be obtained from the Federal Energy Regulatory Commission, Division of Information Services, Public Reference and Files Maintenance Branch, Washington, DC 20426.

(d) Available capacity. (1) An interstate pipeline must provide on its Internet web site and in downloadable file formats, in conformity with §284.12 of this part, equal and timely access to information relevant to the availability of all transportation services

whenever capacity is scheduled, including, but not limited to, the availability of capacity at receipt points, on the mainline, at delivery points, and in storage fields, whether the capacity is available directly from the pipeline or through capacity release, the total design capacity of each point or segment on the system, the amount scheduled at each point or segment whenever capacity is scheduled, and all planned and actual service outages or reductions in service capacity.

(2) An interstate pipeline must make an annual filing by March 1 of each year showing the estimated peak day capacity of the pipeline's system, and the estimated storage capacity and maximum daily delivery capability of storage facilities under reasonably representative operating assumptions and the respective assignments of that capacity to the various firm services provided by the pipeline.

(e) Semi-annual storage report. Within 30 days of the end of each complete storage injection and withdrawal season, the interstate pipeline must file with the Commission a report of storage activity. The report must be signed under oath by a senior official, consist of an original and five conformed copies, and contain a summary of storage injection and withdrawal activities to include the following:

(1) The identity of each customer injecting gas into storage and/or withdrawing gas from storage, identifying any affiliation with the interstate pipeline;

(2) The rate schedule under which the storage injection or withdrawal service was performed;

(3) The maximum storage quantity and maximum daily withdrawal quantity applicable to each storage customer;

(4) For each storage customer, the volume of gas (in dekatherms) injected into and/or withdrawn from storage during the period; and (5) The unit charge and total revenues received during the injection/withdrawal period from each storage customer, noting the extent of any discounts permitted during the period.

(f) Notice of bypass. An interstate pipeline that provides transportation (except storage) to a customer that is located in the service area of a local distribution company and will not be delivering the customer's gas to that local distribution company, must file with the Commission, within thirty days after commencing such transportation, a statement that the interstate pipeline has notified the local distribution company and the local distribution company's appropriate regulatory agency in writing of the proposed transportation prior to commencement.

[Order 637, 65 FR 10221, Feb. 25, 2000, as amended by Order 637–A, 65 FR 35765, June 5, 2000; Order 2004, 68 FR 69157, Dec. 11, 2003]

§284.14 [Reserved]

Subpart B—Certain Transportation by Interstate Pipelines

§284.101 Applicability.

This subpart implements section 311(a)(1) of the NGPA and applies to the transportation of natural gas by any interstate pipeline on behalf of:

(a) Any intrastate pipeline; or

(b) Any local distribution company.

§284.102 Transportation by interstate pipelines.

(a) Subject to paragraphs (d) and (e) of this section, other provisions of this subpart, and the conditions of subpart A of this part, any interstate pipeline is authorized without prior Commission approval, to transport natural gas on behalf of:

(1) Any intrastate pipeline; or

(2) Any local distribution company.

(b) Any rates charged for transportation under this subpart may not exceed the just and reasonable rates established under subpart A of this part.

(c) An interstate pipeline that engages in transportation arrangements under this subpart must file reports in accordance with §284.13 and §284.106 of this chapter.

(d) Transportation of natural gas is not on behalf of an intrastate pipeline or local distribution company or authorized under this section unless:

(1) The intrastate pipeline or local distribution company has physical custody of and transports the natural gas at some point; or

1. Pursuant to the Commission's Regulations at 18 C.F.R. Section 284.13 (c), Iroquois Gas Transmission System, L.P. (Iroquois) herewith submits in electronic format its index of Customers for the quarter commencing April 1, 2007.

Screen Capture 18-Jun-07, ~ 10:30 AM EDT -- http://online1.iroquois.com/new-internet/igts/iol/informationalpostings/Reports/I110040107.tab

H "Iroquois Gas Transmission System, L.P." 110 3/30/2007 O 4/1/2007 T "Scott E. Rupff, (203) 925-7291"

D Apache Corporation 66961551 N RTS 305002 12/1/2003 11/1/2008 N 5058
A Nexen Marketing U.S.A. Inc. N
P M2 WADDINGTON 29 67707 ZONE 1 5058
P MQ BROOKFIELD 29 68098 ZONE 2 5058

D "Astoria Generating Company, L.P." 101985930 N RTS 289504 3/1/2006 11/1/2007 Y 10000
A Sequent Energy Management N
P M2 BROOKFIELD 29 68098 ZONE 2 10000
P MQ HUNTS POINT 29 321765 ZONE 2 10000

D "Astoria Generating Company, L.P." 101985930 N RTS 289505 3/1/2006 2/1/2014 Y 10000
A Sequent Energy Management N
P M2 WADDINGTON 29 67707 ZONE 1 10000
P MQ HUNTS POINT 29 321765 ZONE 2 10000

D "Astoria Generating Company, L.P." 101985930 N RTS 289506 4/1/2007 2/1/2014 Y 40000
A Sequent Energy Management N
P M2 WADDINGTON 29 67707 ZONE 1 40000
P MQ HUNTS POINT 29 321765 ZONE 2 40000

D BP Canada Energy Marketing Corp. 248799413 N RTS 225002 11/1/2006 5/1/2014 N 13115
A BP Canada Energy Marketing Corp. N
P M2 WADDINGTON 29 67707 ZONE 1 13115
P MQ SOUTH COMMACK 29 68102 ZONE 2 13115

D Bay State Gas Company 69340214 N RTS 182001 11/1/1993 11/1/2013 N 28840
A Bay State Gas Company N
P M2 WADDINGTON 29 67707 ZONE 1 28840
P MQ WRIGHT 29 16409 ZONE 1 28840

```
D       Boston Gas Company        6951586 N       RTS     42001   12/1/1991       12/1/2011               N       44110
A       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island       N
P       M2      WADDINGTON        29      67707   ZONE 1  44110
P       MQ      WRIGHT  29        16409   ZONE 1  44110

D       "Bridgeport Energy, LLC" 113780378        N       RTS     604501  5/4/2006 8/1/2018       N       94000
A       Bear Energy LP   N
P       M2      RIVER ROAD        29      245204  ZONE 2  94000
P       MQ      STRATFORD         29      245206  ZONE 2  94000

D       "Brooklyn Navy Yard Cogen. Partners, LP"  808843569        N       RTS     198001  10/1/1996       10/1/2016               N   25548
A       Tenaska Marketing Ventures        N
P       M2      WADDINGTON        29      67707   ZONE 1  25548
P       MQ      SOUTH COMMACK     29      68102   ZONE 2  25548

D       Brooklyn Union Gas Co. dba Keyspan Energy Delivery New York 6978795 N       RTS     54001   1/25/1992       1/25/2012       N       70819
A       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island       N
P       M2      WADDINGTON        29      67707   ZONE 1  70819
P       MQ      SOUTH COMMACK     29      68102   ZONE 2  70819

D       Brooklyn Union Gas Co. dba Keyspan Energy Delivery New York 6978795 N       RTS     54003   11/1/2001       11/1/2011       N       10117
A       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island       N
P       M2      WADDINGTON        29      67707   ZONE 1  10117
P       MQ      SOUTH COMMACK     29      68102   ZONE 2  10117

D       Cargill Incorporated      6249189 N       RTS     308503  11/1/2006       11/1/2007               N       0               x1
A       Cargill Incorporated      N
P       M2      SOUTH COMMACK     29      68102   ZONE 2  0               x1
P       MQ      WRIGHT  29        16409   ZONE 1  0               x1

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P       MQ      BROOKFIELD        29      68098   ZONE 2  14800
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D       Central Hudson Gas & Electric Corporation 6993695 N       RTS     51001   1/25/1992       1/25/2012               N       20234
A       Central Hudson Gas & Electric Corporation N
P       M2      WADDINGTON        29      67707   ZONE 1  20234
P       MQ      PLEASANT VALLEY   29      67577   ZONE 2  20234

D       Colonial Gas Company      6954903 N       RTS     48001   12/1/1991       12/1/2011               N       6070
A       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island       N
P       M2      WADDINGTON        29      67707   ZONE 1  6070
P       MQ      WRIGHT   29       16409   ZONE 1  6070

D       Connecticut Light & Power Company 6917090 N       RTS     174001  7/1/1994 7/1/2014        N       54631
A       NRG Power Marketing Inc.  N
P       M2      SHELTON A         29      68099   ZONE 2  54631
P       MQ      DEVON    29       147191  ZONE 2  54631

D       Connecticut Natural Gas Corporation       1139294 N       RTS     60001   1/25/1992       1/25/2012               N       25292
A       Connecticut Natural Gas Corporation       N
P       M2      WADDINGTON        29      67707   ZONE 1  25292
P       MQ      BROOKFIELD        29      68098   ZONE 2  10117
P       MQ      SHELTON A         29      68099   ZONE 2  15175

D       Connecticut Natural Gas Corporation       1139294 N       RTS     60007   11/1/2006       11/1/2009               N       6128
A       Connecticut Natural Gas Corporation       N
P       M2      WADDINGTON        29      67707   ZONE 1  6128
P       MQ      WRIGHT   29       16409   ZONE 1  6128

D       ConocoPhillips Company    1368265 N       RTS     301505  11/1/2005       6/1/2017        N       10117           x3
A       ConocoPhillips Company    N
P       M2      WADDINGTON        29      67707   ZONE 1  10117           x3
P       MQ      SOUTH COMMACK     29      68102   ZONE 2  10117           x3

D       Consolidated Edison Company of New York Inc.      6982359 N       RTS     56001   1/25/1992       1/25/2012               N   20234
A       Consolidated Edison Company of New York Inc.      N
P       M2      WADDINGTON        29      67707   ZONE 1  20234
P       MQ      SOUTH COMMACK     29      68102   ZONE 2  20234
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A       Consolidated Edison Company of New York Inc.       N
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P       MQ      HUNTS POINT     29      321765  ZONE 2  20000

D       Consolidated Edison Company of New York Inc.       6982359 N       RTS     56006   2/5/2004 2/1/2013       Y       30000
A       Consolidated Edison Company of New York Inc.       N
P       M2      WADDINGTON      29      67707   ZONE 1  30000
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D       "Coral Energy Resources, L.P."    15014421 N       RTS     217007  11/1/2005       11/1/2012               N       25292
A       "Coral Energy Resources, L.P."    N
P       M2      WADDINGTON      29      67707   ZONE 1  25292
P       MQ      WRIGHT  29      16409   ZONE 1  25292

D       "El Paso Marketing,  L.P."        51776169 N       RTS     265004  7/15/2005       11/1/2012               N       12950
A       "El Paso Marketing,  L.P."        N
P       M2      WADDINGTON      29      67707   ZONE 1  12950
P       MQ      WRIGHT  29      16409   ZONE 1  12950

D       "EnergyNorth Natural Gas, Inc."   194387015        N       RTS     47001   12/1/1991       12/1/2011               N       4047
A       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island      N
P       M2      WADDINGTON      29      67707   ZONE 1  4047
P       MQ      WRIGHT  29      16409   ZONE 1  4047

D       Essex County Gas Company 6954556 N       RTS     49001   12/1/1991       12/1/2011               N       2023
A       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island      N
P       M2      WADDINGTON      29      67707   ZONE 1  2023
P       MQ      WRIGHT  29      16409   ZONE 1  2023

D       Hess Corporation 6979785          RTS     136510  6/1/2006 4/1/2009       N       10000
A       Hess Corporation N
P       M2      SOUTH COMMACK   29      68102   ZONE 2  10000
P       MQ      WRIGHT  29      16409   ZONE 1  10000

D       Hess Corporation 6979785          RTS     136511  6/1/2006 4/1/2009       N       10100
A       Hess Corporation N
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P       MQ      WADDINGTON      29      67707   ZONE 1  10100
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D       "Integrys Energy Services, Inc."  841739824        N       RTS     282504  11/1/2006       11/1/2007               N     500
A       "Integrys Energy Services, Inc."  N
P       M2      WADDINGTON      29      67707   ZONE 1  500
P       MQ      WRIGHT  29      16409   ZONE 1  500

D       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island      53106352 N       RTS     55001   1/25/1992       1/25/2012          N     65760
A       Brooklyn Union Gas Co. dba Keyspan Energy Delivery New York N
P       M2      WADDINGTON      29      67707   ZONE 1  65760
P       MQ      SOUTH COMMACK   29      68102   ZONE 2  65760

D       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island      53106352 N       RTS     55008   11/1/2004       11/1/2014          N     12000
A       Brooklyn Union Gas Co. dba Keyspan Energy Delivery New York N
P       M2      WADDINGTON      29      67707   ZONE 1  12000
P       MQ      SOUTH COMMACK   29      68102   ZONE 2  12000

D       KeySpan Gas East Corp dba Keyspan Energy Delivery Long Island      53106352 N       RTS     55009   11/1/2004       11/1/2007          Y     30000
A       Brooklyn Union Gas Co. dba Keyspan Energy Delivery New York N
P       M2      WADDINGTON      29      67707   ZONE 1  30000
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D       "KeySpan Ravenswood, Inc."        68735377 N       RTS     284002  2/5/2004 2/1/2013       Y       60000
A       "KeySpan Ravenswood, Inc."        N
P       M2      WADDINGTON      29      67707   ZONE 1  60000
P       MQ      HUNTS POINT     29      321765  ZONE 2  60000

D       Milford Power Co. LLC     85501711 N       RTS     271002  11/1/2000       11/1/2010               N       35000
A       Bear Energy LP   N
P       M2      WADDINGTON      29      67707   ZONE 1  35000
P       MQ      MILFORD B       29      281335  ZONE 2  35000

D       Milford Power Co. LLC     85501711 N       RTS     271003  7/1/2001 10/1/2010              N       0               x4
A       Bear Energy LP   N
P       M2      WADDINGTON      29      67707   ZONE 1  0               x4
P       MQ      MILFORD B       29      281335  ZONE 2  0               x4

D       NJR Energy Services Company       25715165 N       RTS     289011  11/1/2006       1/25/2012               N       20000
A       NJR Energy Services Company       N
P       M2      WADDINGTON      29      67707   ZONE 1  20000
P       MQ      SOUTH COMMACK   29      68102   ZONE 2  20000
```

```
D       NStar Gas Company          75345678 N        RTS      61001    8/1/1999 12/1/2011                N        4553
A       NStar Gas Company          N
P       M2       WADDINGTON        29       67707    ZONE 1   4553
P       MQ       WRIGHT   29       16409    ZONE 1   4553

D       "New Athens Generating Co., LLC"  799660022        N        RTS      268001   9/1/2003 9/1/2018         N        70000
A       "Merrill Lynch Commodities, Inc." N
P       M2       WRIGHT   29       16409    ZONE 1   70000
P       MQ       ATHENS   29       349565   ZONE 2   70000

D       New Jersey Natural Gas Company     61843553 N        RTS      57001    1/25/1992        1/25/2012                N        20468
A       New Jersey Natural Gas Company     N
P       M2       WADDINGTON        29       67707    ZONE 1   20468
P       MQ       SOUTH COMMACK     29       68102    ZONE 2   20468

D       New York State Electric & Gas Corporation 806303350        N        RTS      52001    11/1/1992        12/1/2011                N    17199        x5
A       New York State Electric & Gas Corporation N
P       M2       WADDINGTON        29       67707    ZONE 1   17199          x5
P       MQ       BROOKFIELD        29       68098    ZONE 2   17199          x5

D       Nexen Marketing U.S.A. Inc.        254171267        N        RTS      100010   8/1/2004 11/1/2007                N        9106
A       Nexen Marketing U.S.A. Inc.        N
P       M2       WADDINGTON        29       67707    ZONE 1   9106
P       MQ       BROOKFIELD        29       68098    ZONE 2   9106

D       Nexen Marketing U.S.A. Inc.        254171267        N        RTS      100014   3/1/2007 6/1/2007         N        25000
A       Nexen Marketing U.S.A. Inc.        N
P       M2       HUNTS POINT       29       321765   ZONE 2   25000
P       MQ       BROOKFIELD        29       68098    ZONE 2   25000

D       Niagara Mohawk Power Corporation   6994735  N        RTS      73005    11/1/1993        11/1/2011                N        49096
A       Tenaska Marketing Ventures         N
P       M2       WADDINGTON        29       67707    ZONE 1   49096
P       MQ       CROGHAN  29       147193   ZONE 1   49096

D       Niagara Mohawk Power Corporation   6994735  N        RTS      73008    10/1/2001        11/1/2011                N        2500
A       Tenaska Marketing Ventures         N
P       M2       WADDINGTON        29       67707    ZONE 1   2500
P       MQ       BOONVILLE         29       264332   ZONE 1   2500
```

```
D       Northern Utilities          49286305 N       RTS     181001  11/1/1993       11/1/2012               N       6569
A       Bay State Gas Company       N
P       M2      WADDINGTON          29      67707   ZONE 1  6569
P       MQ      WRIGHT   29         16409   ZONE 1  6569

D       "Progas USA, Inc."          252066782       N       RTS     114006  11/1/1998       11/1/2007               N       16160
A       BP Canada Energy Marketing Corp.  N
P       M2      WADDINGTON          29      67707   ZONE 1  16160
P       MQ      BROOKFIELD          29      68098   ZONE 2  16160

D       "Selkirk Cogen Partners, LP"        787327881       N       RTS     45001   11/1/1992       11/1/2012               N       21246
A       Coral Energy Canada Inc.  N
P       M2      WADDINGTON          29      67707   ZONE 1  21246
P       MQ      WRIGHT   29         16409   ZONE 1  21246

D       "Selkirk Cogen Partners, LP"        787327881       N       RTS     45005   11/1/1994       11/1/2014               N       55643
A       Coral Energy Canada Inc.  N
P       M2      WADDINGTON          29      67707   ZONE 1  55643
P       MQ      WRIGHT   29         16409   ZONE 1  55643

D       Sempra Energy Trading Corporation 609746565         N       RTS     171013  5/1/2006 5/1/2008       N       10100
A       Sempra Energy Trading Corporation N
P       M2      WRIGHT   29         16409   ZONE 1  10100
P       MQ      WADDINGTON          29      67707   ZONE 1  10100

D       Sempra Energy Trading Corporation 609746565         N       RTS     171012  5/1/2006 5/1/2008       N       10000
A       Sempra Energy Trading Corporation N
P       M2      SOUTH COMMACK       29      68102   ZONE 2  10000
P       MQ      WRIGHT   29         16409   ZONE 1  10000

D       Sempra Energy Trading Corporation 609746565         N       RTS     171022  4/1/2007 11/1/2007              N       10000
A       Sempra Energy Trading Corporation N
P       M2      WRIGHT   29         16409   ZONE 1  10000
P       MQ      WADDINGTON          29      67707   ZONE 1  10000

D       Sempra Energy Trading Services Corp.        175530732       N       RTS     173025  11/1/2005       4/1/2008        N       0       x6
A       Sempra Energy Trading Corporation N
P       M2      WADDINGTON          29      67707   ZONE 1  0               x6
P       MQ      CANAJOHARIE         29      68097   ZONE 1  0               x6
```

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D       Sempra Energy Trading Services Corp.      175530732       N       RTS     173027  11/1/2006       4/1/2008        N       0       x7
A       Sempra Energy Trading Corporation N
P       M2      WADDINGTON      29      67707   ZONE 1  0               x7
P       MQ      HUNTS POINT     29      321765  ZONE 2  0               x7

D       "St. Lawrence Gas Company, Inc."  43827138 N       RTS     164006  11/1/1998       11/1/2013               N       3000
A       "St. Lawrence Gas Company, Inc."  N
P       M2      WADDINGTON      29      67707   ZONE 1  3000
P       MQ      NEW BREMEN      29      147192  ZONE 1  3000

D       The Narragansett Electric Company dba National Grid       1193655 N       RTS     50001   12/1/1991       12/1/2011               N       1012
A       The Narragansett Electric Company dba National Grid       N
P       M2      WADDINGTON      29      67707   ZONE 1  1012
P       MQ      WRIGHT  29      16409   ZONE 1  1012

D       The Southern Connecticut Gas Company      97221246 N      RTS     53001   1/25/1992       1/25/2012               N       35409
A       Connecticut Natural Gas Corporation       N
P       M2      WADDINGTON      29      67707   ZONE 1  35409
P       MQ      MILFORD 29      68101   ZONE 2  35409

D       The Southern Connecticut Gas Company      97221246 N      RTS     53006   10/1/2004       5/1/2016        N       10000           x8
A       Connecticut Natural Gas Corporation       N
P       M2      WADDINGTON      29      67707   ZONE 1  10000           x8
P       MQ      MILFORD 29      68101   ZONE 2  10000           x8

D       UBS Energy LLC   487201915        N       RTS     285502  7/21/2005       11/1/2012               N       14315
A       UBS Energy LLC   N
P       M2      WADDINGTON      29      67707   ZONE 1  14315
P       MQ      WRIGHT  29      16409   ZONE 1  14315

D       Yankee Gas Services Company       361667371       N       RTS     59001   12/1/1991       12/1/2011               N       59690
A       Yankee Gas Services Company       N
P       M2      WADDINGTON      29      67707   ZONE 1  59690
P       MQ      WRIGHT  29      16409   ZONE 1  9105
P       MQ      NEW MILFORD     29      67578   ZONE 2  12646
P       MQ      SHELTON A       29      68099   ZONE 2  22258
P       MQ      SHELTON B       29      68100   ZONE 2  12646
P       MQ      BROOKFIELD      29      68098   ZONE 2  3035
```

F 1 "The Cargill Incorporated contract 308503 is for 25,000 Dth from Nov 1 to Apr 1, 0 Dth from Apr 1 to Jun 1, and 25,000 Dth from Jun 1 to Nov 1."

F 2 "The Cargill Incorporated contract 308504 is for 25,125 Dth from Nov 1 to Apr 1, 0 Dth from Apr 1 to Jun 1, and 25,125 Dth from Jun 1 to Nov 1."

F 3 "The ConocoPhillips Company contract 301505 is for 10,117 Dth from Oct 1 to Jun 1 for each year of the service contract (zero Dth at other times)."

F 4 "The Milford Power Co. LLC Contract 271003 is for 8,783 Dth from Jul 1 to Oct 1 for each year of the service contract (zero Dth at other times)"

F 5 "The NYSEG 52001 contract is for 17,199 Dth from Oct 1 to Jul 1 and 8,416 Dth from Jul 1 to Oct 1 for each year of the service contract."

F 6 "The Sempra 173025 contract is for 5,058 Dth from Nov 1 to Apr 1 for each year of the service contract."

F 7 "The Sempra 173027 contract is for 19,227 Dth from Nov 1 to Apr 1 for each year of the service contract."

F 8 "The SCG 53006 contract is for 10,000 Dth from Oct 1 to Dec 1; 7,000 Dth for Dec 1 to Jan 1; 10,000 Dth for Jan 1 to May 1; and 0 Dth from May 1 to Oct 1 for each year of the service contract."

Appendix 3

Information Response Provided on June 29, 2007

BROADWATER

Broadwater Energy
c/o TransCanada Corporation
450 – 1st Street S.W.
Calgary, Alberta, Canada
T2P 5H1

June 29, 2007

George R. Stafford, Director
New York State Department of State
Division of Coastal Resources
41 State Street
Albany, New York, U.S.A.
12231-0001

Dear Mr. Stafford:

Subject: Information Request Responses from June 13, 2007 Meeting

In response to requests for additional information relating to the proposed Broadwater Energy project from our recent meeting on June 13, 2007, please find enclosed documentation relating to a dimensional analysis of representative commercial vessels in Long Island Sound and how they compare to the Broadwater FSRU and LNG carriers that would visit the proposed FSRU facility.

If there are any questions concerning the attached information, please feel free to contact me at 403-920-2046.

ORIGINAL SIGNED

Murray Sondergard
Project Director

Cc: Robert Alessi (LeBoeuf, Lamb, Greene & MacRae) - w/o attach
John Hritcko (Broadwater) – w/o attach

Broadwater Energy

Dimensional Comparison of Vessels in Long Island Sound to Proposed Broadwater Facility

Date: June 29, 2007

Comments:

The attached table provides a general dimensional comparison between other commercial vessels in Long Island Sound, the Broadwater FSRU and a range of membrane-type LNG carriers. To generate a representative range, Broadwater consulted the Coast Guard Waterway Suitability Report (WSR), Section 2.2.1.1 for a summary of commercial vessel sizes and tonnage.

Also provided are representative ship descriptions for a number of commercial vessel types. The detailed dimensions of these vessels are provided which should enable development of a profile of the vessel appearance on the water.

With the project being located 9 miles offshore, differences in perceptions of size will be relatively small. For example, assuming that the FSRU is 500 feet longer and the height from the water line to the deck is 50 feet higher than other comparable commercial vessels, at a distance of 9 miles this amounts to a difference of 0.6 degrees horizontally on the horizon and 0.06 degrees vertically. It is questionable whether these differences would be perceived as being significant in the eyes of shoreside observers.

Broadwater Energy

Table 1 - Dimensional Comparison of Vessels in Long Island Sound to Proposed Broadwater Facility

	LNG Facilities [1]			Representative Dimensions of Commercial Vessels					
Dimension	Broadwater FSRU 350,000 m^3	Membrane Type LNG Carrier 145,700 m^3	Membrane Type LNG Carrier 216,000 m^3	Large Size Oil Tanker [2]	Medium Size Oil Tanker [3]	Large Size Barge [4]	Medium Size Barge	Handysize Bulk Carrier	Passenger Ship Royal Pacific
Length	1,215	909	994	738	591	797	300-400	520	592
Width	200	142	164	106	106	106	65	73	84
Draft	40	40	41	21	25	46	38	31	22
Representative Distance from Waterline to Deck Manifold	80	69	72	46	38	20	20	34	140 [5]

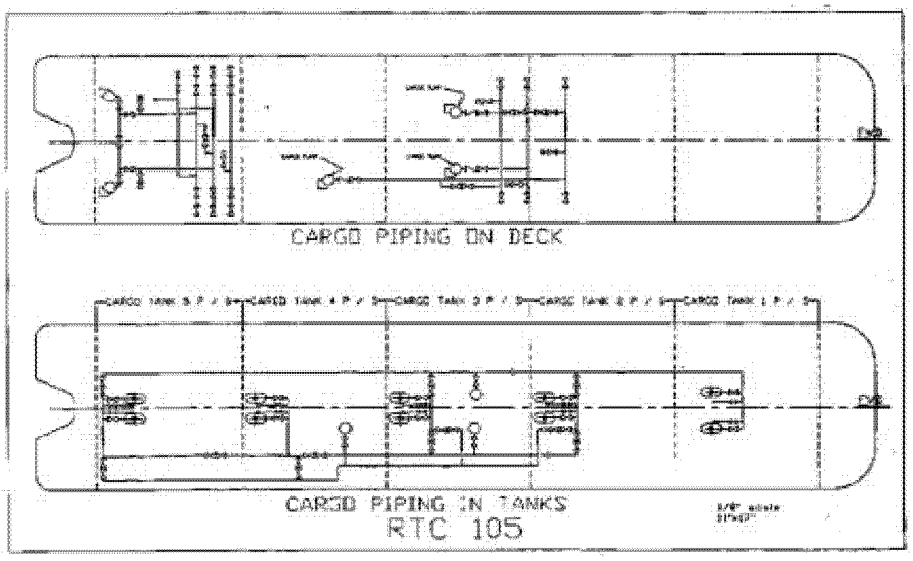
Notes/References:

(1) LNG carrier dimensions as presented in Broadwater LNG: Response to U.S. Coast Guard Letter Dated December 21, 2005; Report No: 70014347; Table 3-1 Vessel Design Particulars.
(2) Large size oil tanker based on 70,000 DWT Emerald Bay (vessel particulars attached).
(3) Medium size oil tanker based on 48,000 DWT Sunny Express (vessel particulars attached).
(4) Large size barge based on 75,000 DWT Nelvana (vessel particulars attached).
(5) Estimated distance to top of passenger deck; no deck manifold on passenger ship.

Broadwater Energy

Table 2 - Representative Barge Details

Barge Name: R.T.C. 135	Official Number: D1089422
Routes: Oceans	Length: 440' 0"
Gross Tons: 8,198.00	Beam: 72' 6"
Year Built: 1999	Vertical Height: 65' 0"
ABS Classed Depth: 41' 0"	
CAPACITY	
Load Line Draft: 28' 6"	Light Draft: 10' 6"
Load Line: 135,000.00	Light Ship Weight: 3758
Loaded Draft: 28' 6"	Full Load Displacement: 22540
Harbor: 135,000.00	Dead Weight Tons: 19,500.00



Barge Name: R.T.C. 105	Official Number: D625979
Routes: Oceans	Length: 380' 0"
Gross Tons: 4,892.00	Beam: 72' 0"
Year Built: 1980	Vertical Height: 56' 0"
ABS Classed	Depth: 25' 8"
CAPACITY	
Load Line Draft: 20' 10"	Light Draft: 4' 0"
Load Line: 84,000.00	Light Ship Weight: 2383
Loaded Draft: 24' 8"	Full Load Displacement: 13914
Harbor: 100,000.00	Dead Weight Tons: 11,531.00

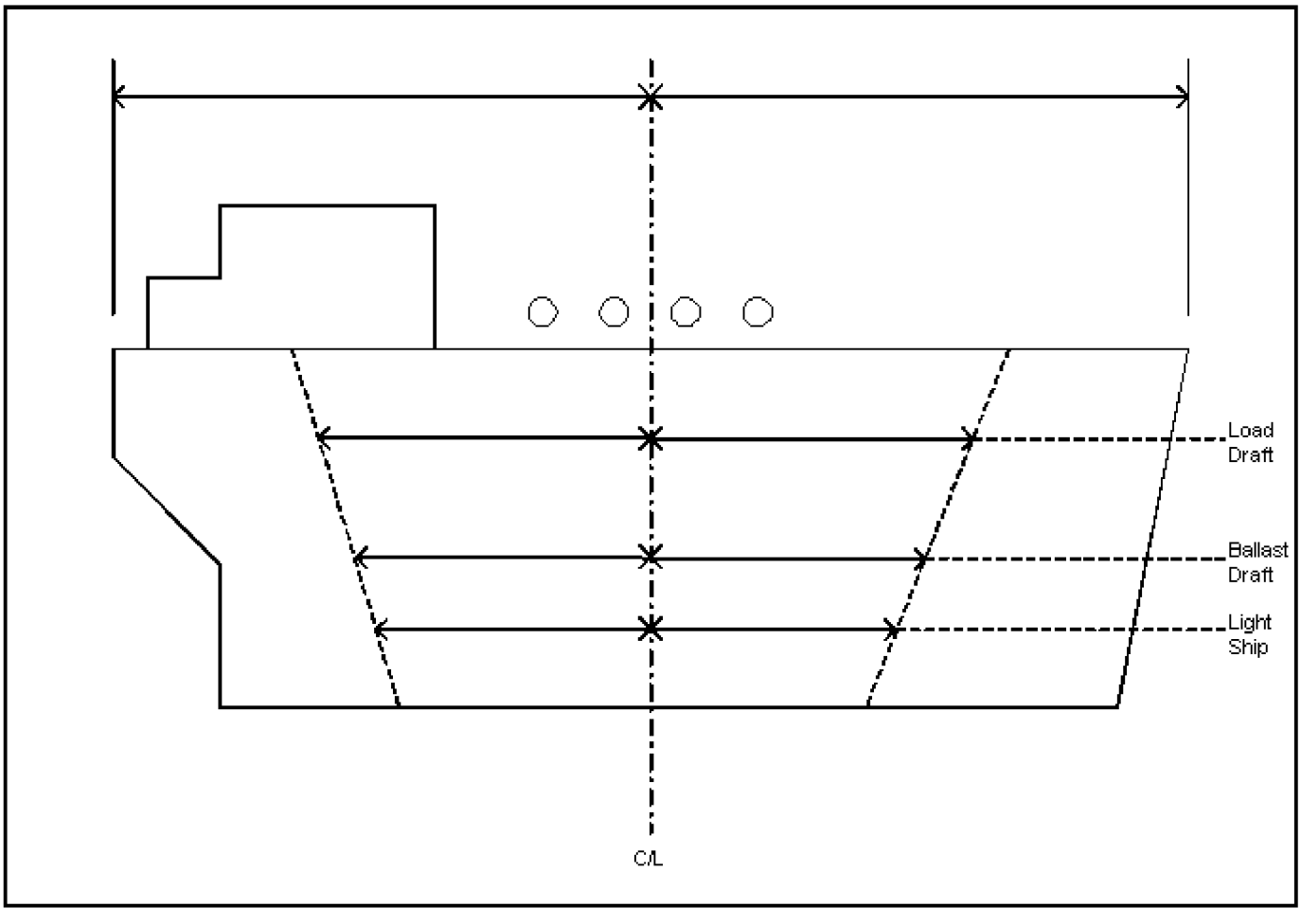
Broadwater Energy

Barge Name: R.T.C. 20	Official Number: D528143
Routes: Oceans	Length: 227' 0"
Gross Tons: 1,306.00	Beam: 43' 0"
Year Built: 1971	Vertical Height: 35' 0"
ABS Classed	Depth: 13' 0"
CAPACITY	
Load Line Draft: 11' 0"	Light Draft: 2' 0"
Load Line: 16,500.00	Light Ship Weight: 462
Loaded Draft: 12' 6"	Full Load Displacement: 2936
Harbor: 20,300.00	Dead Weight Tons: 2,474.00

NYSDOS Information Request
June 29, 2007

Dimensions

1.49	Length overall (LOA)	179.99 Metres
1.50	Length between perpendiculars (LBP)	172 Metres
1.51	Extreme breadth	32.228 Metres
1.52	Moulded breadth	32.2 Metres
1.53	Moulded depth	19.05 Metres
1.54	Keel to masthead	44.52 Metres
1.55	Distance bow to bridge	146.46 Metres
1.56	Distance bridge front - mid point manifold	54.1 Metres
1.57	PARALLEL MID-BODY DIAGRAM	
1.57.1	Distance bow to mid-point manifold	92.36 Metres
1.57.2	Distance stern to mid-point manifold	87.6 Metres
1.57.3	Light ship parallel body length	57.6 Metres
1.57.4	Light ship parallel body - bow to mid-point manifold	31.4 Metres
1.57.5	Light ship parallel body - stern to mid-point manifold	26.2 Metres
1.57.6	Normal ballast parallel body length	83.975 Metres
1.57.7	Normal ballast parallel body length - bow to mid point manifold	46.117 Metres
1.57.8	Normal ballast parallel body length - stern to mid point manifold	37.858 Metres
1.57.9	Parallel body length at Summer Deadweight (SDWT)	89.886 Metres
1.57.10	Parallel body length at SDWT - bow to manifold	46.713 Metres
1.57.11	Parallel body length at SDWT - stern to mid point manifold	43.173 Metres
1.58	Does ship have a bulbous bow?	Yes



Tonnages

1.59	Net Registered Tonnage	12945 Tonnes
1.60	Gross Tonnage	28799 Tonnes

1.61	Suez Tonnage	27216.32 Tonnes
1.62	Panama Tonnage	23913 Tonnes

Loadline Information

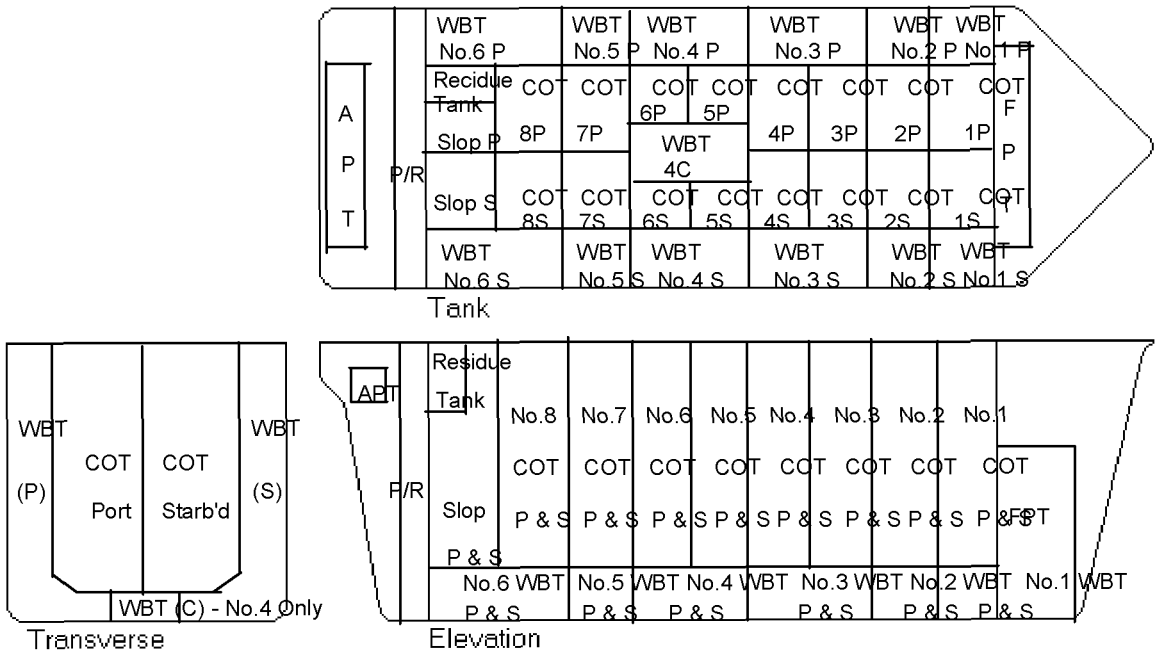
		Freeboard	Draft	Deadweight	Displacement
1.63	Summer	6.601 Metres	12.478 Metres	47999 Tonnes	57285 Tonnes
1.64	Winter	6.861 Metres	12.218 Metres	46653 Tonnes	55939 Tonnes
1.65	Tropical	6.341 Metres	12.738 Metres	49348 Tonnes	58634 Tonnes
1.66	Lightship	16.758 Metres	2.231 Metres	0 Tonnes	9286 Tonnes
1.67	Normal Ballast Condition	11.594 Metres	7.485 Metres	23202 Tonnes	32488 Tonnes
1.68	Segregated Ballast Condition	11.989 Metres	7.09 Metres	21419 Tonnes	30705 Tonnes

Loadline Information and Recent Operational History

1.69	FWA at Summer Draft	276 Millimetres
1.70	TPC Immersion at Summer Draft	51.8 Tonnes
1.71.1	Draught Fore at normal ballast conditions	5.69 Metres
1.71.2	Draught Aft at normal ballast conditions	9.49 Metres
1.72	Does ship have Multiple SDWT ?	Yes
1.73	If yes, what is maximum assigned Deadweight?	47999 Tonnes
1.74	Max. height of mast above waterline (air draft) in normal SBT condition?	36 Metres
1.75	Has the ship traded continuously without requirement for repairs since the last dry-dock, except for normal maintenance?	N/A
1.76	The nature of the repair was:	
1.77	Has ship been involved in a pollution incident during the past 12 months?	No
1.78	Has ship been involved in a grounding incident during the past 12 months?	No
1.79	Has ship been involved in a collision during the past 12 months?	No

8. CARGO AND BALLAST SYSTEMS

Cargo And Ballast Handling



Double Hull Vessels

8.2	Is vessel fitted with centreline bulkhead in all cargo tanks?	Yes
8.2.1	If Yes, is bulkhead solid or perforated?	Solid
8.2.2	Is vessel fitted with any full breadth ballast tanks?	No
8.2.3	If Yes, how many ballast tanks are full breadth?	0
8.2.4	Does vessel meet the IMO definition of 'double hull'?	Yes

Cargo Tank Capacities

8.3	Cargo Tank Capacities At 98% Full (M3)					
	Centre				Wings (P & S combined)	
	Tank No.				Tank No.	
8.3.1	1	Cu. Metres		8.3.16	1	4604.7 Cu. Metres
8.3.2	2	Cu. Metres		8.3.17	2	6798.1 Cu. Metres
8.3.3	3	Cu. Metres		8.3.18	3	7342.2 Cu. Metres
8.3.4	4	Cu. Metres		8.3.19	4	7340.7 Cu. Metres
8.3.5	5	Cu. Metres		8.3.20	5	7306.4 Cu. Metres
8.3.6	6	Cu. Metres		8.3.21	6	7332 Cu. Metres
8.3.7	7	Cu. Metres		8.3.22	7	7293 Cu. Metres
8.3.8	8	Cu. Metres		8.3.23	8	6736.8 Cu. Metres
8.3.9	9	Cu. Metres		8.3.24	9	Cu. Metres
8.3.10	10	Cu. Metres		8.3.25	10	Cu. Metres
8.3.11	11	Cu. Metres		8.3.26	11	Cu. Metres
8.3.12	12	Cu. Metres		8.3.27	12	Cu. Metres
8.3.13	13	Cu. Metres		8.3.28	13	Cu. Metres
8.3.14	14	Cu. Metres		8.3.29	14	Cu. Metres

Cargo Manifolds

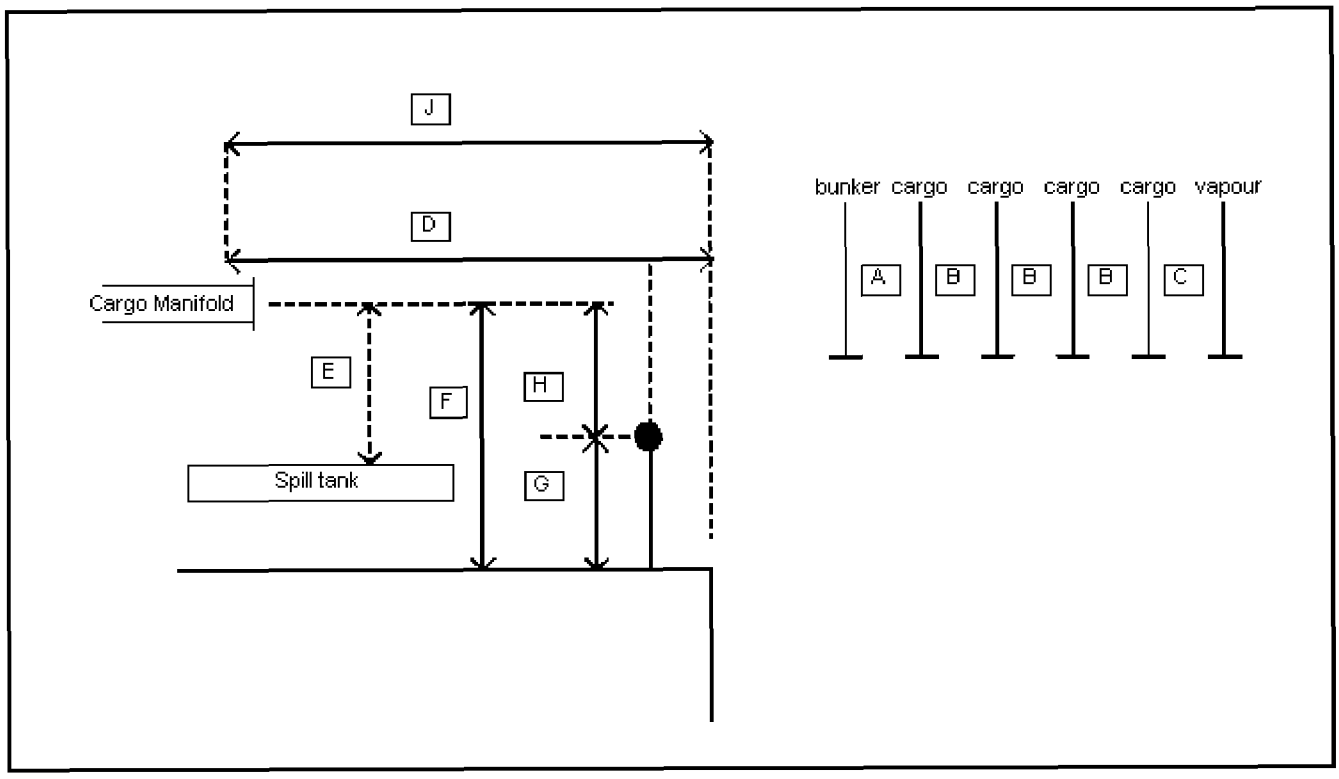
8.80	Does vessel comply with the latest edition of the OCIMF 'Recommendations for Oil Tanker Manifolds and Associated Equipment'?	Yes
8.81	What type of valves are fitted at manifold?	Butterfly
8.82	If hydraulic valves fitted, what are closing times?	seconds
8.83	What is the number of cargo connections per side?	4
8.84	What is the size of cargo connections?	400 Millimetres
8.85	Are pressure gauges fitted outboard of manifold valves?	Yes
8.86	What is the material of the manifold?	MILD STEEL
8.87	Is the vessel fitted with a crossover at the manifold?	Yes
8.88	Are manifold cross-connections made by hard or flexible piping? (chemical carriers)	

Bunker Manifolds

8.89	What is the number of bunker connections per side?	3
8.90	What is the size of the bunker connection?	150 Millimetres

Manifold Arrangement

8.91	Manifold Arrangement Diagram	
8.92	Distance A bunker manifold to cargo manifold	2000 Millimetres
8.93	Distance B cargo manifold to cargo manifold	2000 Millimetres
8.94	Distance C cargo manifold to vapour return manifold	4000 Millimetres
8.95	Distance D manifolds to ship's rail	4400 Millimetres
8.96	Distance E spill tank grating to centre of manifold	900 Millimetres
8.97	Distance F main deck to centre of manifold	2100 Millimetres
8.98	Distance G maindeck to top of rail	1400 Millimetres
8.99	Distance H top of rail to centre of manifold	700 Millimetres
8.100	Distance J manifold to ship side	4600 Millimetres



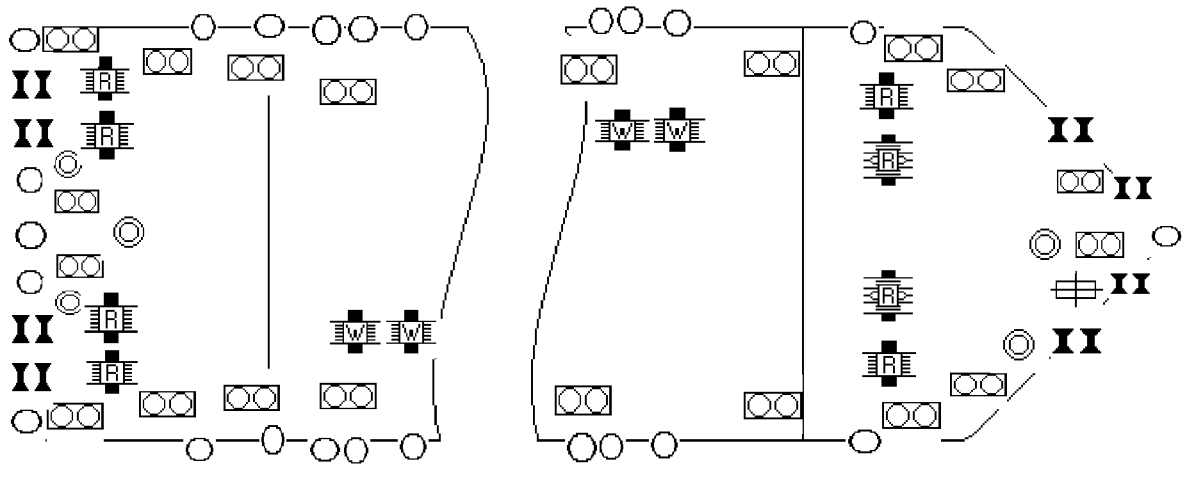
Manifold Arrangement - continued

8.101	What is the height of the manifold connections above the waterline at loaded (Summer Deadweight) condition?	8.701 Metres
8.102	What is the height of the manifold connections above the waterline in normal ballast?	13.694 Metres
8.103	What is the distance between the keel and centre of manifold?	21.15 Metres
8.104	Is vessel fitted with a stern manifold?	No
8.104.1	If stern manifold fitted, state size	Millimetres
8.105	Is vessel fitted with a bow manifold?	No
8.105.1	If bow manifold fitted, state size	Millimetres

Reducers

8.106	Number of Reducers carried	8	from	350 Millimetres	to	400 Millimetres	(diameter)
8.107	Number of Reducers carried	4	from	400 Millimetres	to	200 Millimetres	(diameter)
8.108	Number of Reducers carried	4	from	400 Millimetres	to	250 Millimetres	(diameter)
8.109	Number of Reducers carried	4	from	400 Millimetres	to	300 Millimetres	(diameter)
8.110	Number of Reducers carried	0	from	0 Millimetres	to	0 Millimetres	(diameter)
8.111	To what standard are manifold reducers manufactured?	ANSI					

10. MOORING



Mooring Wires (on Drums)

10.1	Does the vessel comply with the latest edition of OCIMF Mooring Equipment Guidelines?	Yes				
	Mooring Wires (On Drums)	Number	Diameter	Material	Length	Breaking Strength
10.2	Forecastle		mm		Metres	Tonnes
10.3	Forward Main Deck	2	32 mm	Galvanaized Steel	220 Metres	51 Tonnes
10.4	Aft Main Deck	2	32 mm	Galvanized Steel	220 Metres	51 Tonnes
10.5	Poop		mm		Metres	Tonnes
	Mooring Wire Tails	Number	Diameter	Material	Length	Breaking strength
10.7	Forecastle		mm		Metres	Tonnes
10.8	Forward Main Deck	2	70 mm	PP/POLYSTER COMPOSITE	11 Metres	74 Tonnes
10.9	Aft Main Deck	2	70 mm	PP/POLYSTER COMPOSITE	11 Metres	74 Tonnes
10.10	Poop		mm		Metres	Tonnes
10.6	Type of shackle	Mandel				
	Mooring Ropes (On Drums)	Number	Diameter	Material	Length	Breaking Strength
10.11	Forecastle	4	65 mm	PP/POLYESTER COMPOSITE	220 Metres	78 Tonnes
10.12	Forward Main Deck		mm		Metres	Tonnes
10.13	Aft Main Deck		mm		Metres	Tonnes
10.14	Poop	4	65 mm	PP/POLYESTER COMPOSITE	220 Metres	78 Tonnes
	Other Mooring Lines	Number	Diameter	Material	Length	Breaking Strength
10.15	Forecastle	0	0 mm		0 Metres	0 Tonnes
10.16	Forward Main Deck		mm		Metres	Tonnes

10.17	Aft Main Deck		mm		Metres	Tonnes
10.18	Poop	0	0 mm		0 Metres	0 Tonnes

Spare Mooring Wires

	Spare Mooring Wires	Number	Diameter	Material	Length	Breaking strength
10.19	BOATSWAIN STORE	2	32 Millimetres	Galvanaized Steel	220 Metres	51 Tonnes
10.19.1	STEERING GEAR ROOM	2	32 Millimetres	Galvanaized Steel	220 Metres	51 Tonnes
	Spare Mooring Ropes	Number	Diameter	Material	Length	Breaking strength
10.20	BOATSWAIN STORE	3	65 Millimetres	PP/POLYESTER COMPOSITE	220 Metres	78 Tonnes
10.20.1	STEERING GEAR ROOM	3	65 Millimetres	PP/POLYESTER COMPOSITE	220 Metres	78 Tonnes
	Spare Mooring Tails	Number	Diameter	Material	Length	Breaking strength
10.21	BOATSWAIN STORE	2	70 Millimetres	PP/POLYESTER COMPOSITE	11 Metres	74 Tonnes
10.21.1	STEERING GEAR ROOM	2	70 Millimetres	PP/POLYESTER COMPOSITE	11 Metres	74 Tonnes

Mooring Winches

		Number	Single/Double Drums	Split Drums	Motive Power	Heaving Power	Brake Capacity	Hauling Speed
10.22	Forecastle	2	Double Drums	No	Hydraulic	12.5 Tonnes	37.5 Tonnes	12 Mtrs/Min
10.23	Forward Main Deck	1	Double Drums	No	Hydraulic	12.5 Tonnes	37.5 Tonnes	12 Mtrs/Min
10.24	Aft Main Deck	1	Double Drums	No	Hydraulic	12.5 Tonnes	37.5 Tonnes	12 Mtrs/Min
10.25	Poop	2	Double Drums	No	Hydraulic	12.5 Tonnes	37.5 Tonnes	12 Mtrs/Min
10.26	What type of winch brakes are fitted?	MANUAL						
10.27	Is brake testing equipment on board?	Yes						
10.28	When were the brakes last tested?	13 May 2004						

Mooring Bits

10.29	How many sets of mooring bitts are fitted on forecastle?	6
10.29.1	What is their Safe Working Load?	73 Tonnes
10.30	How many sets of mooring bitts are fitted on forward main deck?	4
10.30.1	What is their Safe Working Load?	58 Tonnes
10.31	How many sets of mooring bitts are fitted on aft main deck?	2
10.31.1	What is their Safe Working Load?	58 Tonnes
10.32	How many sets of mooring bitts are fitted on poop deck?	6
10.32.1	What is their Safe Working Load?	73 Tonnes
10.33	Distance of mooring chock for breast/spring lines forward of center of manifold	55.6 Metres
10.34	Distance of mooring chock for breast/spring lines aft of center of manifold	40.4 Metres

Anchors And Windlass

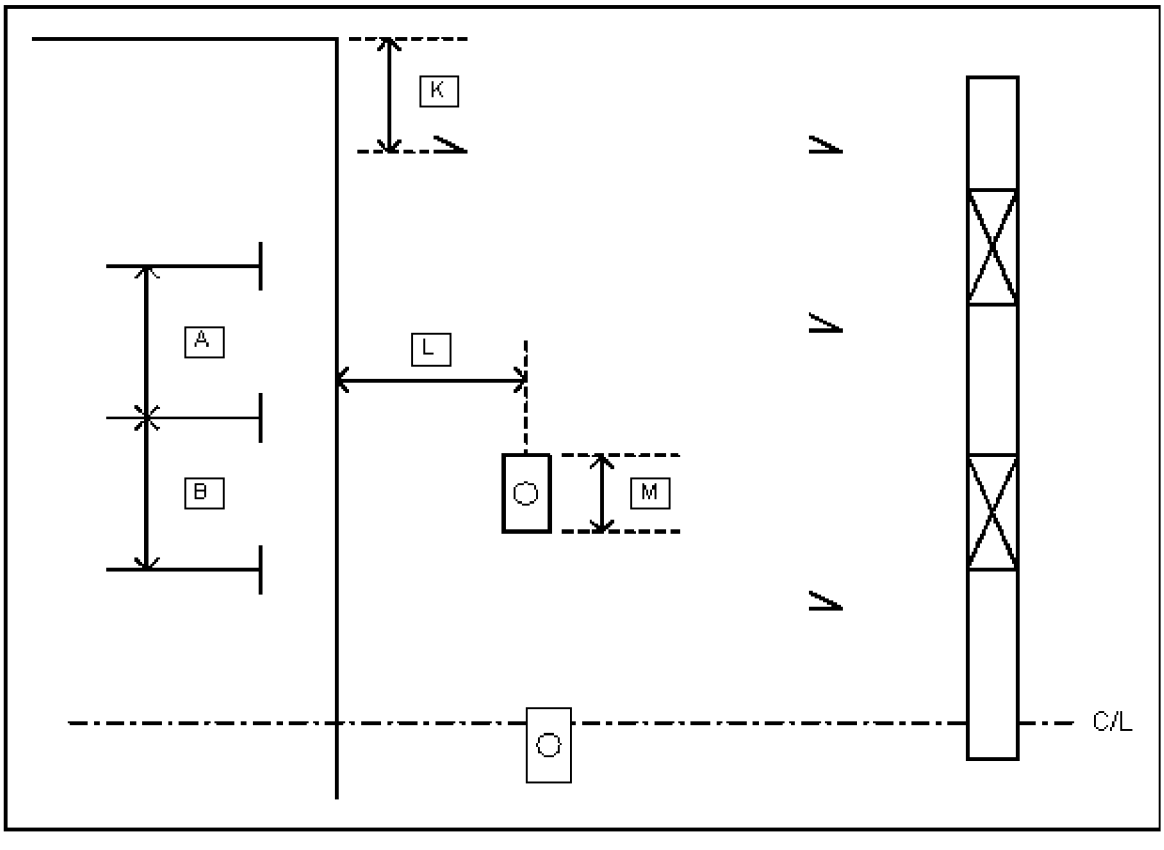
10.35	What is the motive power of the windlass?	Hydraulic
10.36	What is the cable diameter?	73 Millimetres
10.37	Number of shackles - port cable?	11
10.38	Number of shackles - starboard cable?	11
10.39	Are bitter end connections to both cables capable of being slipped?	Yes

Emergency Towing Arrangemnts

10.40	Is the vessel fitted with an Emergency Towing Arrangement?	Yes	
	(if "No" then ignore the remainder of this section)		
		Forward	Aft
10.41	Type of system	TANKTECK KETA-45F	TANKTECK KETA-20A

Manifold Arrangement

10.71	Manifold Arrangement Diagram	
10.72	Distance K end of drip tray to center line of deck cleat	1265 Millimetres
10.73	Distance L spill tray to centre line of bollard	925 Millimetres
10.74	Distance M length of bollard	660 Millimetres



Lifting Equipment

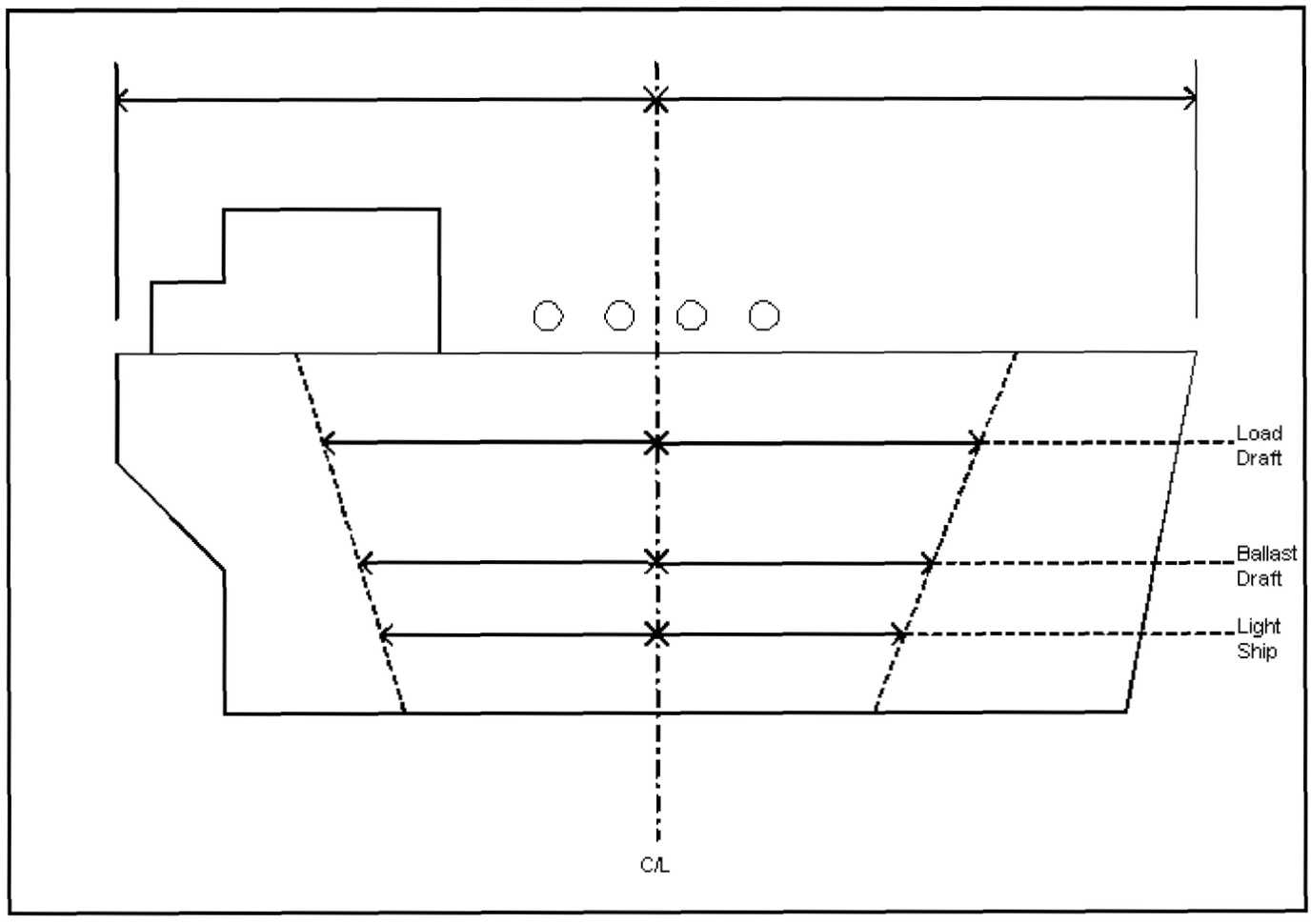
10.75	How many derricks does the vessel have?	
10.75.1	What is their safe working load (SWL)?	Tonnes
10.75.2	Date last tested	
10.76	If cranes are fitted, how many?	1
10.76.1	What is their safe working load (SWL)?	10 Tonnes
10.76.2	Date last tested	27 Nov 2003
10.77	Is Safe Working Load (SWL) clearly marked on all lifting equipment?	Yes
10.78	Do the vessel's derricks or cranes reach at least 1 metre outboard of rail?	Yes
10.79	How many bitts are there on each side of the manifold for tying off submarine hoses?	3

Other Equipment

10.80	Are accommodation ladders arranged to face aft when rigged?	Yes
10.81	Does vessel have Suez Canal boat davits?	No
10.82	Does vessel have Suez Canal projector?	No

Dimensions

1.49	Length overall (LOA)	225 Metres
1.50	Length between perpendiculars (LBP)	215 Metres
1.51	Extreme breadth	32.233 Metres
1.52	Moulded breadth	32.2 Metres
1.53	Moulded depth	20.4 Metres
1.54	Keel to masthead	48.75 Metres
1.55	Distance bow to bridge	188.08 Metres
1.56	Distance bridge front - mid point manifold	71.58 Metres
1.57	PARALLEL MID-BODY DIAGRAM	
1.57.1	Distance bow to mid-point manifold	116.5 Metres
1.57.2	Distance stern to mid-point manifold	108.5 Metres
1.57.3	Light ship parallel body length	84 Metres
1.57.4	Light ship parallel body - bow to mid-point manifold	58 Metres
1.57.5	Light ship parallel body - stern to mid-point manifold	26 Metres
1.57.6	Normal ballast parallel body length	100.8 Metres
1.57.7	Normal ballast parallel body length - bow to mid point manifold	58 Metres
1.57.8	Normal ballast parallel body length - stern to mid point manifold	42.8 Metres
1.57.9	Parallel body length at Summer Deadweight (SDWT)	116.94 Metres
1.57.10	Parallel body length at SDWT - bow to manifold	60.44 Metres
1.57.11	Parallel body length at SDWT - stern to mid point manifold	56.5 Metres
1.58	Does ship have a bulbous bow?	Yes



Tonnages

1.59	Net Registered Tonnage	20834 Tonnes
1.60	Gross Tonnage	39256 Tonnes

1.61	Suez Tonnage	43725.95 Tonnes
1.62	Panama Tonnage	43970 Tonnes

Loadline Information

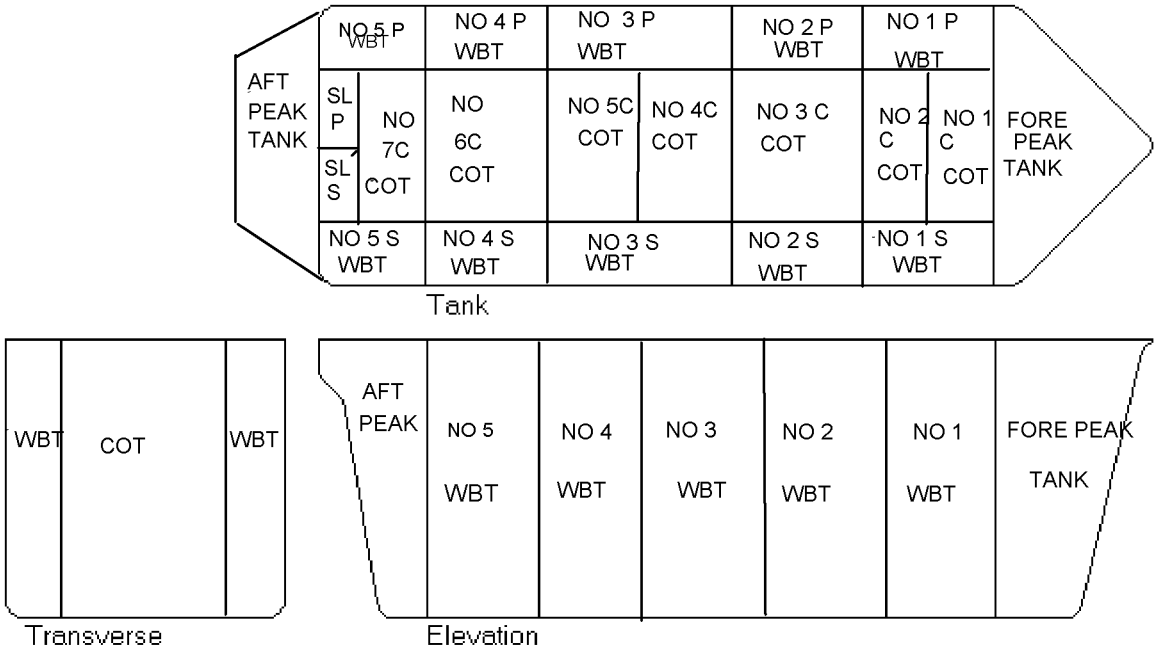
		Freeboard	Draft	Deadweight	Displacement
1.63	Summer	6.654 Metres	13.783 Metres	69999 Tonnes	80728 Tonnes
1.64	Winter	6.941 Metres	13.496 Metres	68143 Tonnes	78872 Tonnes
1.65	Tropical	6.367 Metres	14.07 Metres	71858 Tonnes	82587 Tonnes
1.66	Lightship	18.334 Metres	2.25 Metres	0 Tonnes	10729 Tonnes
1.67	Normal Ballast Condition	14.137 Metres	6.3 Metres	23975 Tonnes	34704 Tonnes
1.68	Segregated Ballast Condition	14.137 Metres	6.3 Metres	23975 Tonnes	34701 Tonnes

Loadline Information and Recent Operational History

1.69	FWA at Summer Draft	311 Millimetres
1.70	TPC Immersion at Summer Draft	64.5 Tonnes
1.71.1	Draught Fore at normal ballast conditions	4.9 Metres
1.71.2	Draught Aft at normal ballast conditions	7.9 Metres
1.72	Does ship have Multiple SDWT ?	Yes
1.73	If yes, what is maximum assigned Deadweight?	69999 Tonnes
1.74	Max. height of mast above waterline (air draft) in normal SBT condition?	41.4 Metres
1.75	Has the ship traded continuously without requirement for repairs since the last dry-dock, except for normal maintenance?	Yes
1.76	The nature of the repair was:	Not Applicable
1.77	Has ship been involved in a pollution incident during the past 12 months?	No
1.78	Has ship been involved in a grounding incident during the past 12 months?	No
1.79	Has ship been involved in a collision during the past 12 months?	No

8. CARGO AND BALLAST SYSTEMS

Cargo And Ballast Handling



Double Hull Vessels

8.2	Is vessel fitted with centreline bulkhead in all cargo tanks?	No
8.2.1	If Yes, is bulkhead solid or perforated?	NA
8.2.2	Is vessel fitted with any full breadth ballast tanks?	No
8.2.3	If Yes, how many ballast tanks are full breadth?	0
8.2.4	Does vessel meet the IMO definition of 'double hull'?	No

Cargo Tank Capacities

8.3	Cargo Tank Capacities At 98% Full (M3)					
	Centre				Wings (P & S combined)	
	Tank No.				Tank No.	
8.3.1	1	8879.6 Cu. Metres		8.3.16	1	Cu. Metres
8.3.2	2	11988.9 Cu. Metres		8.3.17	2	Cu. Metres
8.3.3	3	11991.4 Cu. Metres		8.3.18	3	Cu. Metres
8.3.4	4	11991.4 Cu. Metres		8.3.19	4	Cu. Metres
8.3.5	5	11991.4 Cu. Metres		8.3.20	5	Cu. Metres
8.3.6	6	11991.3 Cu. Metres		8.3.21	6	Cu. Metres
8.3.7	7	9470.3 Cu. Metres		8.3.22	7	Cu. Metres
8.3.8	8	Cu. Metres		8.3.23	8	Cu. Metres
8.3.9	9	Cu. Metres		8.3.24	9	Cu. Metres
8.3.10	10	Cu. Metres		8.3.25	10	Cu. Metres
8.3.11	11	Cu. Metres		8.3.26	11	Cu. Metres
8.3.12	12	Cu. Metres		8.3.27	12	Cu. Metres
8.3.13	13	Cu. Metres		8.3.28	13	Cu. Metres
8.3.14	14	Cu. Metres		8.3.29	14	Cu. Metres

8.3.15	15	Cu. Metres		8.3.30	15	Cu. Metres
8.4	Total	78304.3 Cu. Metres		8.6	Total	0 Cu. Metres
8.5	Slops 1st Tank	2878.6 Cu. Metres		8.7	Slops 3rd tank	97.8 Cu. Metres
8.5.1	Slops 2nd Tank	2977 Cu. Metres		8.7.1	Slops 4th tank	Cu. Metres
8.8	Total	84159.9 Cu. Metres		8.9	Total	97.8 Cu. Metres
8.10				Grand Total Capacity (98%)		84257.7 Cu. Metres

Ballast Tank Capacities

8.11	Ballast Capacities At 100% Full (M3)	
	Tank Identity	Capacity
8.11.1	Fore Peak	1880.4 Cu. Metres
8.11.2	1 Port	2917 Cu. Metres
8.11.3	1Stbd	2937.7 Cu. Metres
8.11.4	2 Port	1511.8 Cu. Metres
8.11.5	2 Stbd	1511.8 Cu. Metres
8.11.6	3 Port	3024.4 Cu. Metres
8.11.7	3 stbd	3024.4 Cu. Metres
8.11.8	4 Port	1496.9 Cu. Metres
8.11.9	4 Stbd	1496.9 Cu. Metres
8.11.10	5 Port	2011.7 Cu. Metres
8.11.11	5 Stbd	2011.7 Cu. Metres
8.11.12	Aft Peak	745.4 Cu. Metres
8.11.13		Cu. Metres
8.11.14	Total Ballast Tank Capacities at 100% full	24570.1 Cu. Metres

Ballast Handling

8.12.1	If vessel is a Pre-MARPOL tanker, indicate by tank number, tanks usually designated for departure ballast.	Not Applicable
8.12.1.1	Tank Location	
8.12.2	If vessel is a Pre-MARPOL tanker, indicate by tank number, tanks usually designated for arrival ballast.	Not Applicable
8.12.2.1	Tank Location	
8.12.3	Can vessel handle cargo and non-segregated ballast concurrently maintaining two valve segregation?	N/A
8.12.4	Can dirty ballast be safely loaded with gas transfer method? (simultaneous cargo discharge and loading of ballast into empty tanks)	N/A

If Vessel Is Cbt Tanker With Manual

8.13	If the vessel is a CBT Tanker with Approved Manual:	
8.13.1	Which cargo tanks are indicated as CBT in the IOPP Certificate?	Not Applicable
8.13.2	What is total capacity of CBT tanks?	Cu. Metres
8.13.3	Is the piping for CBT common with cargo piping or independent?	Not Applicable

If Vessel Is Sbt Tanker

8.14.1	What is total capacity of SBT?	24570.1 Cu. Metres
8.14.2	What percentage of summer deadweight can vessel maintain with SBT only?	36 %
8.14.3	Does vessel meet the requirements of MARPOL Reg 13 (2)?	Yes
8.14.4	Can segregated ballast be discharged through vessel's manifold?	Yes
8.14.5	Is vessel equipped with spool piece designed to connect ballast system to cargo system?	Yes
8.14.6	Do cargo lines pass through any dedicated or segregated ballast tanks?	No
8.14.7	If Yes, what type of expansion is fitted?	Not Applicable
8.14.8	Do ballast lines pass through any cargo tanks?	No
8.14.9	If Yes, what type of expansion is fitted?	Not Applicable
8.14.10	Can vessel pump water ashore for line clearing?	Yes
8.14.11	If Yes, what is maximum attainable discharge rate?	1500 Cu. Metres/Hour
8.14.12	If Yes, what is maximum acceptable back pressure?	12 bar
8.14.13	Which cargo tanks are designated for heavy weather ballast as per IMO?	4C
8.14.13.1	Tank Location	Centre

8.79	What is the maximum loading rate for homogenous cargo?	7500 Cu. Metres/Hour

Cargo Manifolds

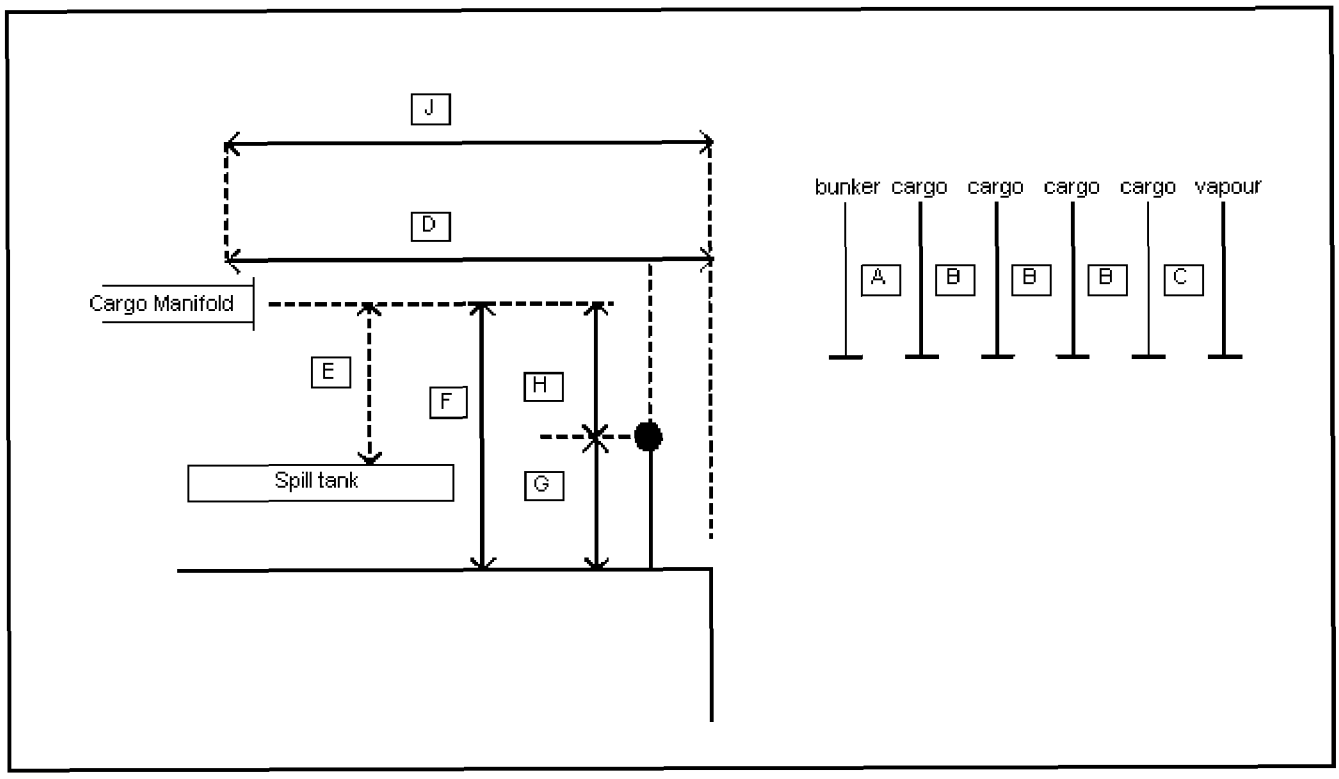
8.80	Does vessel comply with the latest edition of the OCIMF 'Recommendations for Oil Tanker Manifolds and Associated Equipment'?	Yes
8.81	What type of valves are fitted at manifold?	Butterfly
8.82	If hydraulic valves fitted, what are closing times?	seconds
8.83	What is the number of cargo connections per side?	4
8.84	What is the size of cargo connections?	350 Millimetres
8.85	Are pressure gauges fitted outboard of manifold valves?	Yes
8.86	What is the material of the manifold?	STEEL- STPG 38 E
8.87	Is the vessel fitted with a crossover at the manifold?	Yes
8.88	Are manifold cross-connections made by hard or flexible piping? (chemical carriers)	Hard

Bunker Manifolds

8.89	What is the number of bunker connections per side?	3
8.90	What is the size of the bunker connection?	200 Millimetres

Manifold Arrangement

8.91	Manifold Arrangement Diagram	
8.92	Distance A bunker manifold to cargo manifold	2000 Millimetres
8.93	Distance B cargo manifold to cargo manifold	2000 Millimetres
8.94	Distance C cargo manifold to vapour return manifold	1200 Millimetres
8.95	Distance D manifolds to ship's rail	4600 Millimetres
8.96	Distance E spill tank grating to centre of manifold	900 Millimetres
8.97	Distance F main deck to centre of manifold	2000 Millimetres
8.98	Distance G maindeck to top of rail	1200 Millimetres
8.99	Distance H top of rail to centre of manifold	745 Millimetres
8.100	Distance J manifold to ship side	4600 Millimetres



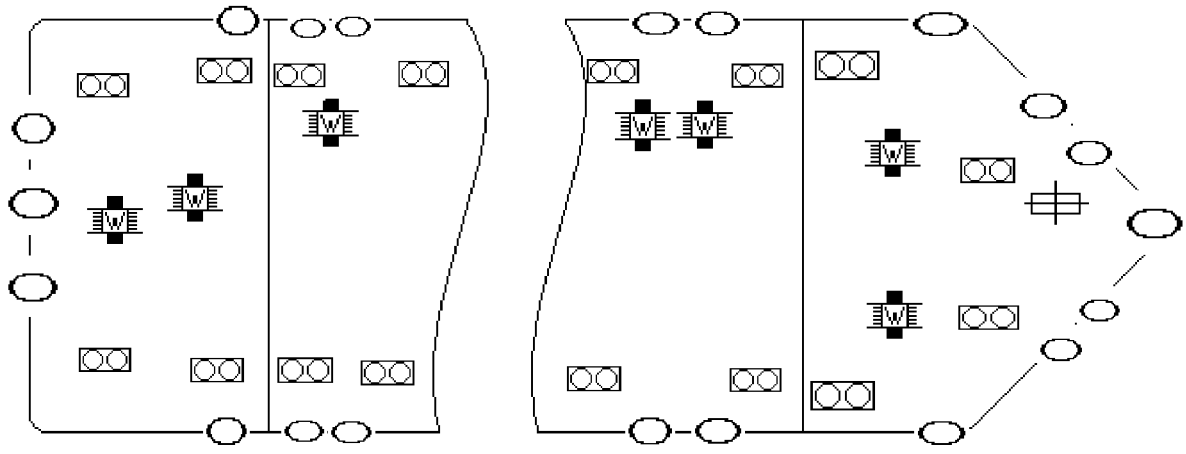
Manifold Arrangement - continued

8.101	What is the height of the manifold connections above the waterline at loaded (Summer Deadweight) condition?	8.654 Metres
8.102	What is the height of the manifold connections above the waterline in normal ballast?	16.237 Metres
8.103	What is the distance between the keel and centre of manifold?	22.44 Metres
8.104	Is vessel fitted with a stern manifold?	No
8.104.1	If stern manifold fitted, state size	Millimetres
8.105	Is vessel fitted with a bow manifold?	No
8.105.1	If bow manifold fitted, state size	Millimetres

Reducers

8.106	Number of Reducers carried	8	from	350 Millimetres	to	400 Millimetres	(diameter)
8.107	Number of Reducers carried	4	from	350 Millimetres	to	300 Millimetres	(diameter)
8.108	Number of Reducers carried	4	from	350 Millimetres	to	250 Millimetres	(diameter)
8.109	Number of Reducers carried	4	from	350 Millimetres	to	200 Millimetres	(diameter)
8.110	Number of Reducers carried	4	from	350 Millimetres	to	150 Millimetres	(diameter)
8.111	To what standard are manifold reducers manufactured?	ANSI					

10. MOORING



Mooring Wires (on Drums)

10.1	Does the vessel comply with the latest edition of OCIMF Mooring Equipment Guidelines?	Yes				
	Mooring Wires (On Drums)	Number	Diameter	Material	Length	Breaking Strength
10.2	Forecastle	4	30 mm	GSWR	220 Metres	70 Tonnes
10.3	Forward Main Deck	4	30 mm	GSWR	220 Metres	50 Tonnes
10.4	Aft Main Deck	2	36 mm	GSWR	220 Metres	50 Tonnes
10.5	Poop	5	30 mm	GSWR	220 Metres	66.7 Tonnes
	Mooring Wire Tails	Number	Diameter	Material	Length	Breaking strength
10.7	Forecastle	4	76 mm	Nylon multifilament	11 Metres	103 Tonnes
10.8	Forward Main Deck	4	76 mm	Nylon multifilament	11 Metres	103 Tonnes
10.9	Aft Main Deck	2	76 mm	Nylon multifilament	11 Metres	103 Tonnes
10.10	Poop	5	76 mm	Nylon multifilament	11 Metres	103 Tonnes
10.6	Type of shackle	Tonsberg				
	Mooring Ropes (On Drums)	Number	Diameter	Material	Length	Breaking Strength
10.11	Forecastle		mm		Metres	Tonnes
10.12	Forward Main Deck		mm		Metres	Tonnes
10.13	Aft Main Deck		mm		Metres	Tonnes
10.14	Poop		mm		Metres	Tonnes
	Other Mooring Lines	Number	Diameter	Material	Length	Breaking Strength
10.15	Forecastle		mm		Metres	Tonnes
10.16	Forward Main Deck		mm		Metres	Tonnes
10.17	Aft Main Deck		mm		Metres	Tonnes

10.18	Poop			mm		Metres	Tonnes

Spare Mooring Wires

	Spare Mooring Wires	Number	Diameter	Material	Length	Breaking strength
10.19	E/R Skylight deck	1	28 Millimetres	GSWR	220 Metres	63 Tonnes
10.19.1			Millimetres		Metres	Tonnes
	Spare Mooring Ropes	Number	Diameter	Material	Length	Breaking strength
10.20	Ford Store	4	52 Millimetres	Combination of Bexcord & Polyster Mixture	220 Metres	64.2 Tonnes
10.20.1	Steering Flat	4	52 Millimetres	Bexcord and Polyster Mixture	220 Metres	64.2 Tonnes
	Spare Mooring Tails	Number	Diameter	Material	Length	Breaking strength
10.21	Ford Store	7	76 Millimetres	Nylon	11 Metres	90 Tonnes
10.21.1			Millimetres		Metres	Tonnes

Mooring Winches

		Number	Single/Double Drums	Split Drums	Motive Power	Heaving Power	Brake Capacity	Hauling Speed
10.22	Forecastle	2	Double Drums	No	Hydraulic	15 Tonnes	38 Tonnes	15 Mtrs/Min
10.23	Forward Main Deck	2	Double Drums	No	Hydraulic	12 Tonnes	30 Tonnes	15 Mtrs/Min
10.24	Aft Main Deck	1	Double Drums	No	Hydraulic	12 Tonnes	30 Tonnes	15 Mtrs/Min
10.25	Poop	2	Triple/double	No	Hydraulic	15 Tonnes	38 Tonnes	15 Mtrs/Min
10.26	What type of winch brakes are fitted?	Manual						
10.27	Is brake testing equipment on board?	Yes						
10.28	When were the brakes last tested?	09 Mar 2005						

Mooring Bits

10.29	How many sets of mooring bitts are fitted on forecastle?	4
10.29.1	What is their Safe Working Load?	72 Tonnes
10.30	How many sets of mooring bitts are fitted on forward main deck?	4
10.30.1	What is their Safe Working Load?	72 Tonnes
10.31	How many sets of mooring bitts are fitted on aft main deck?	4
10.31.1	What is their Safe Working Load?	72 Tonnes
10.32	How many sets of mooring bitts are fitted on poop deck?	4
10.32.1	What is their Safe Working Load?	72 Tonnes
10.33	Distance of mooring chock for breast/spring lines forward of center of manifold	77.2 Metres
10.34	Distance of mooring chock for breast/spring lines aft of center of manifold	57 Metres

Anchors And Windlass

10.35	What is the motive power of the windlass?	Hydraulic
10.36	What is the cable diameter?	76 Millimetres
10.37	Number of shackles - port cable?	12
10.38	Number of shackles - starboard cable?	12
10.39	Are bitter end connections to both cables capable of being slipped?	Yes

Emergency Towing Arrangemnts

10.40	Is the vessel fitted with an Emergency Towing Arrangement?	Yes	
	(if "No" then ignore the remainder of this section)		
		Forward	Aft
10.41	Type of system	Tateno Kashiwa	Tateno Kashiwa
10.42	Safe Working Load (SWL) of system	200 Tonnes	200 Tonnes
10.43	Is pick-up gear provided?	No	Yes
10.44	Towing pennant length	Metres	70 Metres
10.45	Towing pennant diameter	Millimetres	85 Millimetres

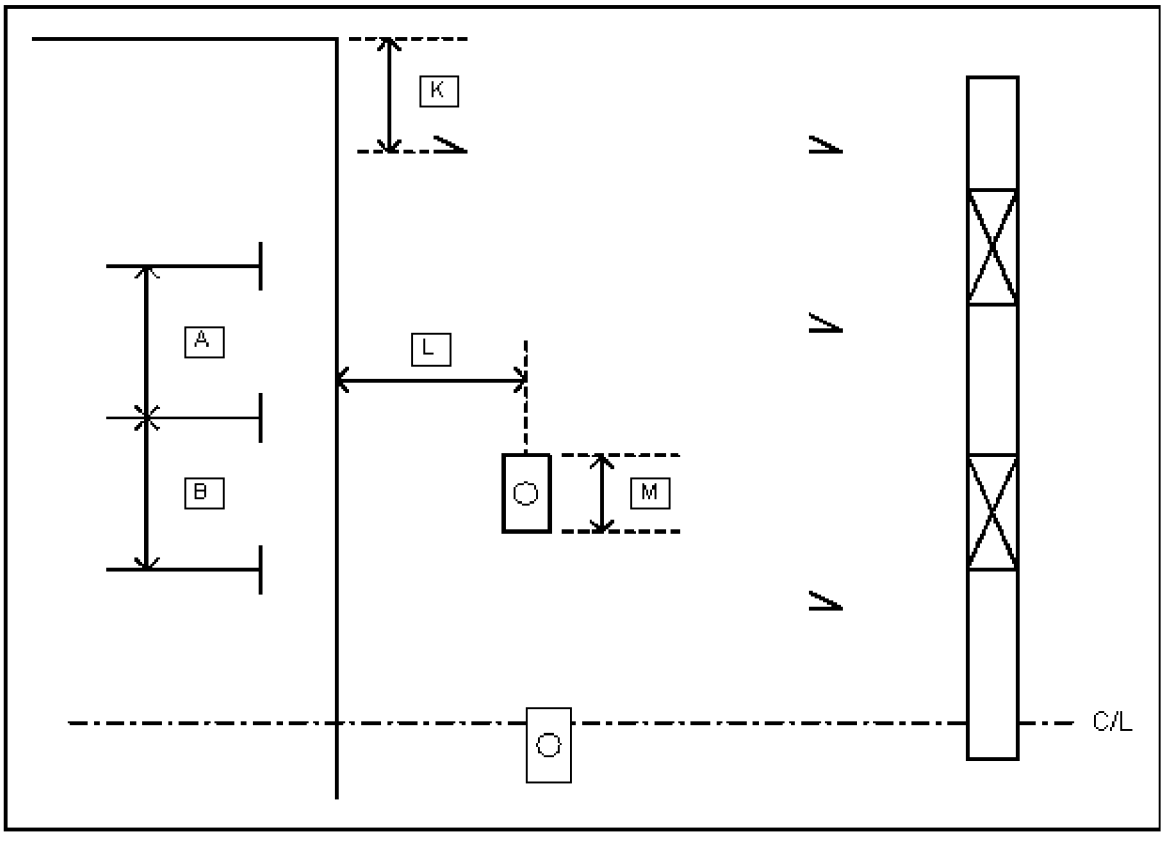
10.46	Type of strong point (Smit bracket etc)	Hinged Bar type	Cosed Fairlead
10.47	Chafing chain size	76 Millimetres	Millimetres
10.48	Fairlead size (in format ABCmm x XYZmm)	450 Millimetres	350 Millimetres
10.49	Is pedestal roller fitted?	Yes	Yes
10.50	Is vessel provided with towing wire?	No	Yes
10.50.1	If Yes, what is the diameter of towing wire?	Millimetres	85 Millimetres
10.50.2	If Yes, what is the length of towing wire?	Metres	70 Metres
10.52	What is the number of bitts in the bow area?	4	
10.53	What is the height of the bitts in the bow area?	840 Millimetres	
10.54	What is the safe working load of the bitts in the bow area?	86 Tonnes	
10.55	What is the distance between bow fairleads and nearest bitts?	4000 Millimetres	
10.56	Is the bow area clear of any obstructions which would hamper towing connections?	Yes	

Escort Tug

10.57	SWL of closed chock on stern	200 Tonnes
10.58	SWL of bollard on poopdeck suitable for escort tug	86 Tonnes
10.59	Are stern chock and bollard capable of towing astern to 90 degrees?	Yes

Manifold Arrangement

10.71	Manifold Arrangement Diagram	
10.72	Distance K end of drip tray to center line of deck cleat	135 Millimetres
10.73	Distance L spill tray to centre line of bollard	460 Millimetres
10.74	Distance M length of bollard	650 Millimetres



Lifting Equipment

10.75	How many derricks does the vessel have?	2
10.75.1	What is their safe working load (SWL)?	15 Tonnes
10.75.2	Date last tested	29 Apr 2003
10.76	If cranes are fitted, how many?	1
10.76.1	What is their safe working load (SWL)?	3 Tonnes
10.76.2	Date last tested	29 Apr 2003
10.77	Is Safe Working Load (SWL) clearly marked on all lifting equipment?	Yes
10.78	Do the vessel's derricks or cranes reach at least 1 metre outboard of rail?	Yes
10.79	How many bitts are there on each side of the manifold for tying off submarine hoses?	4

Other Equipment

10.80	Are accommodation ladders arranged to face aft when rigged?	Yes
10.81	Does vessel have Suez Canal boat davits?	No
10.82	Does vessel have Suez Canal projector?	Yes

NELVANA

The Nelvana unloading coal into a hopper on the Mississippi River.

Built		1983
Classification		Lloyds +100 A1
Length Overall		243.04 metres
Breadth Moulded		32.26 metres
Depth Moulded		20.00 metres
Total Hold Capacity (including hatches)		75,457.60 cubic metres
Deadweight		74,974 tonnes
Draft		13.92 metres
Gross Tonnage		44,340 tonnes
Net Tonnage		19,671 tonnes
Bow Thruster		1200 BHP
Length of Boom		81.70 metres
Discharge Rate	-Coal	2,500 tonnes/hr
	-Ore	5,000 tonnes/hr

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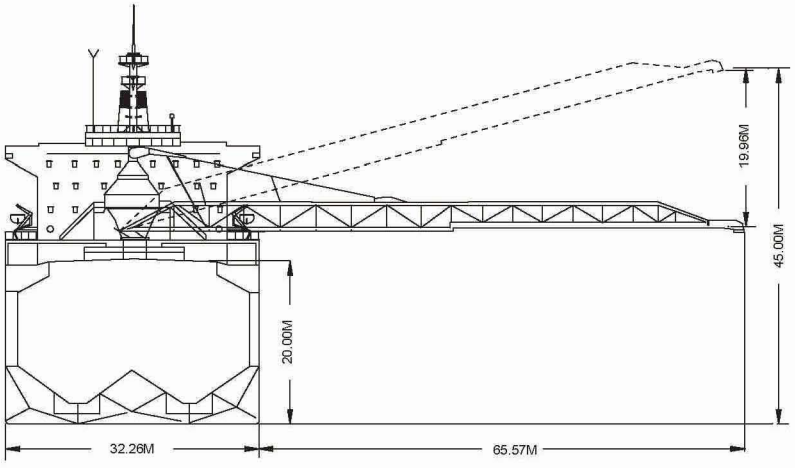
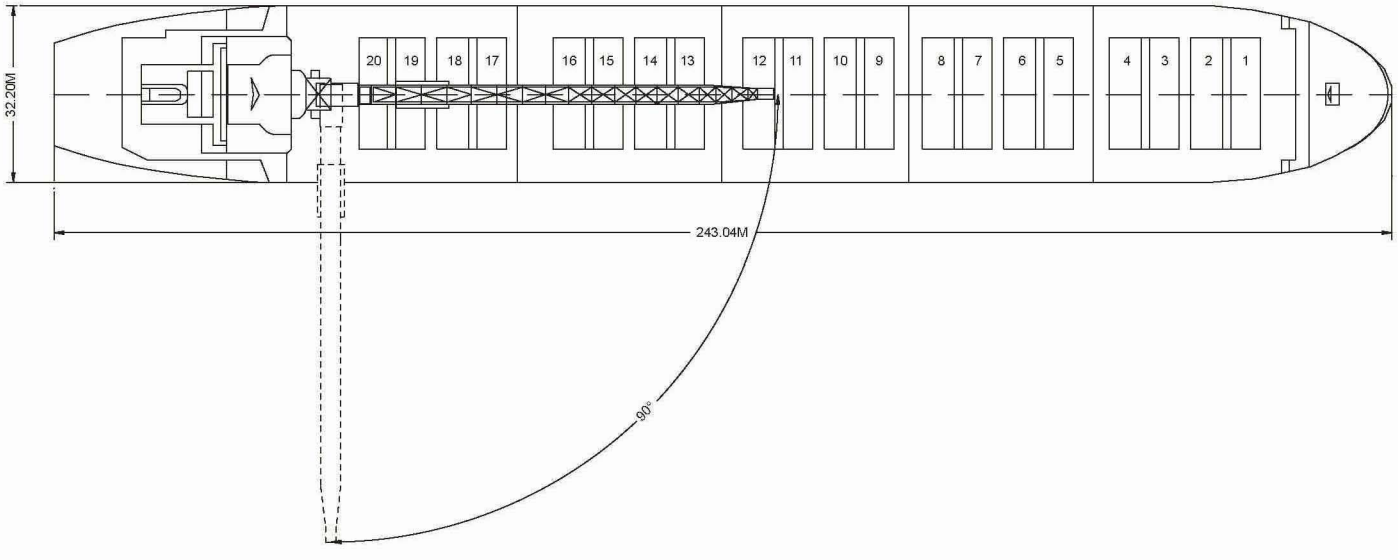
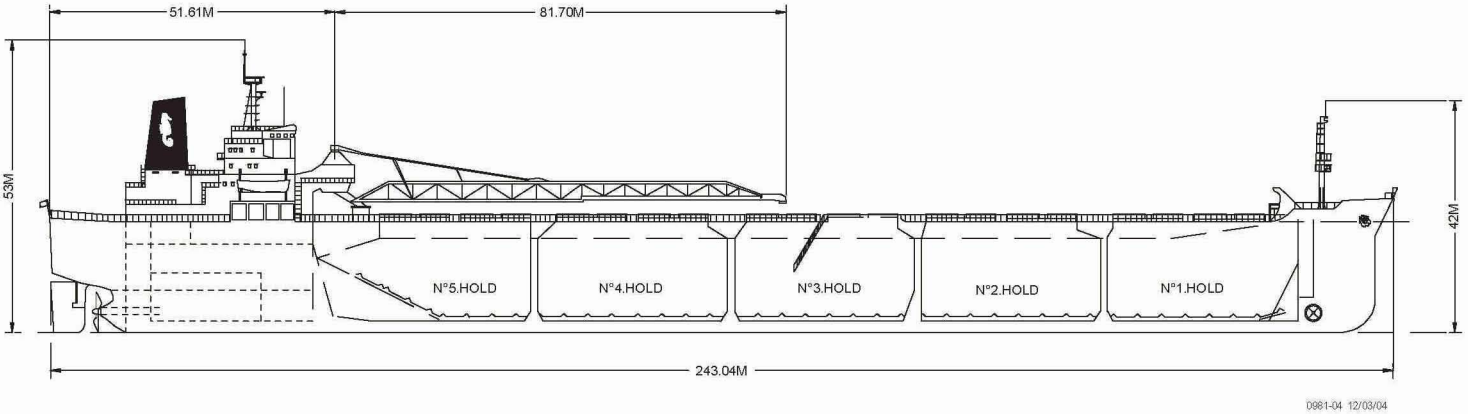
NELVANA







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Air Drafts

(metres)

Draft Condition	Stem	Foremast	Hatches			Cargo Gear	Main Mast		Funnel	Stem	Other Obstruction	Maximum
			Forward	Midship	Aft		Deployed	Lowered				
Keel	21.50	42.00	26.20	21.00	21.00	31.95	53.00	49.90	43.50	24.90	N/A	53.00
Light Ship	16.36	41.47	25.47	15.86	15.86	27.25	46.76	44.76	38.36	24.17	N/A	46.76
Normal Ballast 50% Bunker	13.09	33.80	34.60	12.60	12.60	23.55	43.50	41.50	35.10	16.50	N/A	43.50
Fully Loaded 50% Bunker	7.66	28.36	12.36	7.16	7.16	18.11	38.06	36.06	29.66	11.06	N/A	38.06

Hatch and Hold Specifications

Hold Number	1	2	3	4	5	6	7	TOTAL
Hold Volumes (cubic metres)								
Cubic	14,444.4	14,792.8	14,732.2	15,976.9	13,020.7			72,967.0
Maximum Grain	14,925.8	15,295.1	15,234.5	16,479.2	13,523.0			75,457.6
Grain in way of Hatch	481.4	502.3	502.3	502.3	502.3			2,490.6
Hold Openings (metres)								
Number of Openings	3	4	4	4	4			20
Opening Length	5.78	5.78	5.78	5.78	5.78			
Opening Width	19.76	19.76	19.76	19.76	19.76			
Coaming Height above Keel	20.60	20.60	20.60	20.60	20.60			
Hatch Information (metres)								
Description	Steel Water Tight	Steel Water Tight	Steel Water Tight	Steel Water Tight	Steel Water Tight			
Operation	Gantry Lift	Gantry Lift	Gantry Lift	Gantry Lift	Gantry Lift			
Hatch Length	5.82	5.82	5.82	5.82	5.82			
Hatch Width	21.60	21.60	21.60	21.60	21.60			
Hatch Top Height above Keel	21.49	21.49	21.49	21.49	21.49			

Cargo Handling Equipment

- Double belt gravity system with loop belt elevator.
- 82m discharge boom luffing to 18 deg. and slewing to 100 deg. P & S.
- Hold hoppers are covered with ultra high molecular weight polyethylene.
- Designed discharge rate of up to 5,000 tonnes / hour
- Dust Suppression: Water Spray
- Unloader Boom Length: 81.70 metres
- Discharge Rate - Coal: 2,500 tonnes/hr
  - Ore: 5,000 tonnes/hr
- Maximum Boom Outreach: 65.57 metres

Consumption (tonnes per day)

	Speed		Main Engine	Generators
	Loaded	Ballast	IFO	MDO
Sea	14.5 knots	15.2 knots	49.5	3.8
Port / Anchorage			0	4.4
Loading / Discharge			0	12.2

For more information on this ship please visit www.cslint.com

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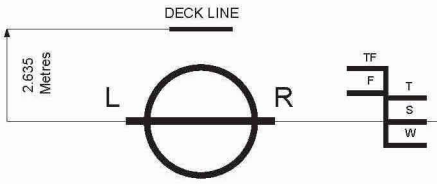
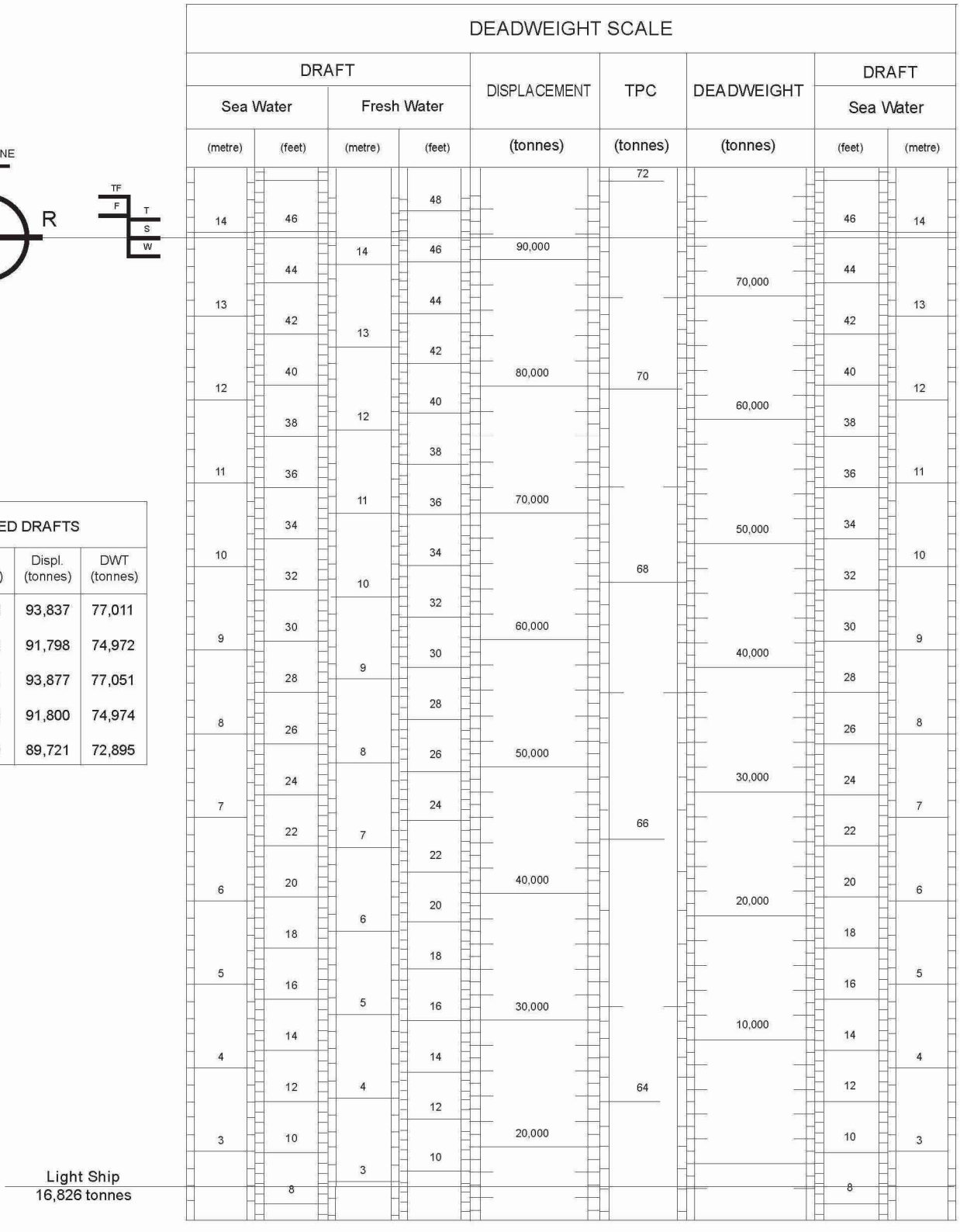
NELVANA



ASSIGNED DRAFTS			
Season	Draft (metre)	Displ. (tonnes)	DWT (tonnes)
TF	14.53	93,837	77,011
F	14.24	91,798	74,972
T	14.21	93,877	77,051
S	13.92	91,800	74,974
W	13.63	89,721	72,895



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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list in this proceeding in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure.

Dated at Washington, D.C. this 15th day of August, 2007.

/s/ *Deborah J. Koch*
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Submission Contents