200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

Synapse
Energy Economics, Inc.

The Proposed Broadwater LNG Import Terminal
Response to Draft Environmental Impact Statement and Update of Synapse Analysis

Prepared by:
Ezra Hausman and Kenji Takahashi,
Synapse Energy Economics
22 Pearl Street, Cambridge, MA 02139
www.synapse-energy.com
617-661-3248

January 22, 2007

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

Background

In March, 2006, Synapse Energy Economics ("Synapse") released a report entitled "The Proposed Broadwater LNG Import Terminal: An Analysis and Assessment of Alternatives"[140] ("Synapse Report"). The purpose of the Synapse Report, prepared at the request of Save the Sound,[141] was to identify and evaluate potential alternatives to the proposed Broadwater Liquefied Natural Gas (LNG) import terminal in Long Island Sound to meet the long-term energy needs of the New York and Connecticut markets.

In brief, the Synapse Report concluded that:

- There is no evidence that the regional market requires a base load gas supply facility capable of providing an additional one billion cubic feet per day (bcf/d) of natural gas to meet its immediate or long-term needs. More pressing may be an infrastructure or other investment to address potential supply deficiencies during peak winter heating periods. However, the studies prepared by Broadwater Energy do not substantiate even this requirement for the region;

- Other, environmentally preferable approaches to resolving any anticipated peak load supply shortfall would provide economically and socially preferable alternatives to any perceived supply deficiency. Such approaches include increased development and use of local storage facilities; investments in natural gas and electric energy efficiency and renewable energy resources; expanded use of combined heat and power technology; and repowering of existing gas-fired power plants to increase fuel efficiency. The report quantified the substantial potential of these resources, and found them to be far more than sufficient to offset projected growth in natural gas demand. The increase in renewable energy assumed in our analysis is consistent with state mandates (called Renewable Portfolio Standards or RPS) in New York and Connecticut;

- Even if additional base load sources of natural gas are ultimately required to balance regional demand, Broadwater is not the most promising source of supply. The Bear Head and Canaport LNG import terminals in eastern Canada, for example, were expected to begin receiving deliveries and transporting gas to the northeast United States through the upgraded Maritimes and Northeast (M&N) pipeline as soon as 2008. The total incremental volume of gas that could be delivered through these new and upgraded facilities was projected to be 1.5 bcf per day, and these supplies will be available at least two years earlier than Broadwater could begin operations. These facilities, which were already under construction, are among a number of supply and demand alternatives which do not threaten the integrity of a national environmental treasure[142].

---

[140] http://www.synapse-energy.com/Downloads/SynapseReport.2006-03.Save-the-Sound.Alternatives-to-Broadwater-LNG-Terminal.05-033.pdf

[141] Save the Sound (http://www.savethesound.org) is a program of the Connecticut Fund for the Environment (CFE, http://www.cfenv.org) dedicated to the restoration, protection, and appreciation of Long Island Sound and its watershed through advocacy, education and research.

[142] Long Island Sound was designated an "Estuary of National Significance" under §320 of the Clean Water Act in 1988.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

- The proposition that LNG will represent an abundant and inexpensive source of natural gas is not supported by the existing and projected dynamics of the global LNG market.

Since the release of this report, a number of events have occurred which make it appropriate to review our analysis and conclusions. These events include:

- The approval of two offshore LNG import terminals in Massachusetts waters by then-Governor Mitt Romney which, subject only to final approval by the U.S. Maritime Administration, would begin delivering gas to the northeast gas market as early as December 2007 (Northeast Gateway) and December 2009 (Neptune);[143]

- The January 9, 2007 filing of a notice with FERC from the Repsol Energy North America Corporation, part owner of the Canaport LNG facility in Saint John, New Brunswick, clarifying that they have firm commitments from the Maritimes and Northeast (M&N) Pipeline company to deliver 0.73 bcf of gas from Canaport into the northeastern United States;[144]

- The delay of the proposed Bear Head LNG terminal in Eastern Canada for lack of reliable source of supply;

- The release of updated gas demand forecasts from the U.S. Energy Information Administration (US EIA);[145]

- The release of the Broadwater Draft Environmental Impact Statement (DEIS) in November 2006, which addresses some of the issues raised in our report;[146]

- Certain public claims by Broadwater Energy regarding the economic benefits of the project, specifically their claim that it will save households in the region an average (median) of $300 per year in energy costs from 2011 through 2025;[147]

- Legislation enacted in 2005 (Public Act 05-1) in Connecticut created a new requirement for electricity suppliers and distribution companies to acquire 1% of their supply from combined heat and power, or from commercial or industrial energy efficiency measures to be in place by January 2007. The requirement increases to 4% by January 1, 2010;

- The Southwest Connecticut region now has around 250 MW of demand-response measures that are used to alleviate generation and transmission congestion in the region.

Review of basic conclusions

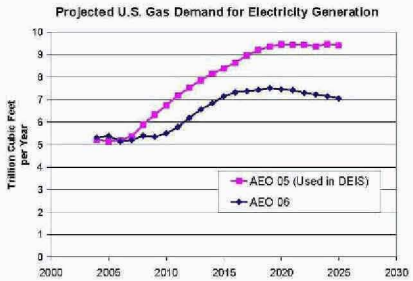
None of these recent events has altered our basic conclusion, that the Broadwater terminal is not required to meet the future energy needs of New York and Connecticut. To the contrary, both of

[143] http://www.boston.com/news/local/articles/2006/12/20/governor_approves_2_lng_ports/. See also the press release from the Governor's office dated December 19 2006, attached.
[144] http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20070111-0066. This document is also attached.
[145] http://www.eia.doe.gov/oiaf/forecasting.html
[146] http://www.ferc.gov/industries/lng/enviro/eis/11-17-06-eis.asp
[147] http://www.broadwaterenergy.com/index.php?page=economic_benefits

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

our primary conclusions have been strengthened. The updated U.S. Government forecast for gas demand over the next two decades has been revised significantly downward relative to previously available forecasts, largely due to the disappearance of additional gas-fired electricity generation from utility resource plans.

OC1-102 This change in projected gas demand for electricity generation is shown in the figure below. The upper line in the figure is the future demand for natural gas for electricity generation, as projected in the US EIA's 2005 Annual Energy Outlook report. It projects growth from a level of just over 5 tcf per year today, to around 8.5 tcf by 2015, finally leveling off at around 9.5 tcf per year by 2020. The lower line is the updated forecast in the Annual Energy Outlook report for 2006. It projects just over 7 tcf per year by 2015, peaking at around 7.5 tcf in 2020 and declining thereafter. For perspective, the decrease in the updated forecast for 2020, from 9.5 tcf to 7.5 tcf per year, is equivalent to about six Broadwater terminals operating at full capacity. Given this change in outlook, even the 2005 forecast, which is the most recent source referenced by the DEIS to project future gas needs, cannot be relied upon because it greatly overstates future gas needs. A more recent source, such as the 2006 Annual Energy Outlook report, would be more appropriate.[148]



OC1-103 Further, Public Act 05-1 in Connecticut, along with the expanded use of demand management in the southwest region of the state, demonstrate that the Synapse report may have been particularly conservative in estimating the future role of demand management resources in meeting the region's energy needs. Thus we conclude that it is still a preferable and feasible alternative for New York and Connecticut to meet their future energy needs with less costly, lower impact resources such as demand management, development of renewable resources, increased use of combined heat and power, repowering of existing inefficient plants, and increased use of seasonal storage.

OC1-104 In addition, the recent events regarding other LNG terminals and gas pipelines make it even clearer that the region will be experiencing increased diversity and security of gas supply in the future, even without Broadwater. The LNG terminals in Massachusetts are scheduled to begin gas deliveries in 2007 and 2009, well ahead of the Broadwater schedule, with a combined send-

[148] The 2007 Annual Energy Outlook is available in early release form and should be considered when finalized.

OC1-102 Sections 1.1.2 and 1.1.3 of the final EIS have been updated to include the most recent projections available at the time of final EIS preparation.

OC1-103 Please see our responses to comments OC1-19 and OC1-20.

OC1-104 Section 4.3.2 of the final EIS evaluates the potential of each existing, approved, and planned LNG terminal in the region to serve as an alternative to the proposed Broadwater Project, including the Canaport LNG Terminal and the Northeast Gateway and Neptune Deepwater Ports.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-104 out capability equal to that of Broadwater; moreover, operations of the Canaport terminal are scheduled to commence in 2008 and has a firm commitment from the M&N pipeline to carry 0.73 bcf per day of gas into the northeast United States.

OC1-105 All of these facilities add to the available gas supplies for New York and Connecticut because there are no delivery constraints from the northeast U.S. into this region. They can provide supply either directly, by transporting gas to the region through the interstate pipeline system, or indirectly, by releasing pipeline capacity that would otherwise be reserved for moving supplies through the region and northward. The technical feasibility of delivering these supplies, and the transportation cost advantages they may enjoy over Broadwater, are discussed on pages 10 and 11 of the Synapse Report.

Availability of LNP from other northeast terminals

In the Synapse Report, we discussed the availability of natural gas imported into eastern Canada at two LNG terminals then under construction, to be delivered to the northeastern United States markets through the M&N pipeline system:

> ...we find that other incremental sources of natural gas supply which can reach the regional market are already under development, and will begin to provide gas substantially before the Broadwater facility could be brought on line. The most likely near-term source of additional gas supply is the upgraded Maritimes and Northeast (M&N) pipeline,[149] which will deliver gas from at least two LNG import terminals already under construction in eastern Canada...these terminals are expected to deliver gas beginning in 2008, around the same time that the Phase IV upgrade to the M&N pipeline will enable it to deliver the additional gas to the region. Other proposed LNG import facilities in the northeast United States, and/or expansions of existing facilities, are also likely to begin delivering gas at least as early as Broadwater could do so. Almost all of these facilities are downstream of the New York and Connecticut markets.
>
> *Synapse Report, pp.4-5*

The fact that these terminals are "downstream" of the target market means that there are no pipeline capacity constraints preventing delivery of the gas to that region. While this may seem counterintuitive, deliveries to a downstream market on the gas pipeline system can serve an upstream market in one or both of two ways. If there is excess gas in the downstream market, the pipeline can actually flow in the reverse direction to be delivered to the market. Otherwise, the gas can displace gas that would otherwise be delivered to the downstream market, and make that gas available for use upstream.

The figure below, excerpted from the Research Data International (RDI) natural gas infrastructure map[150], shows the portion of the interstate gas pipeline system in the northeastern United States, along with existing and proposed LNG terminals:

[149] www.mnp-usa.com.
[150] Published by Intelligence Press, 2005.

OC1-105 As described in Section 4.3.1 of the final EIS, delivery of natural gas from Canada or Massachusetts through existing pipeline systems would require infrastructure improvements to transport the gas to New York City and Long Island. Although it would be technically feasible to provide gas through those systems, the infrastructure improvements would result in environmental impacts that would be greater than those of the proposed Broadwater Project.

On August 27, 2007, Algonquin proposed the East to West HubLine Expansion Project, which would supply approximately 1.1 bcfd of natural gas, mostly derived from recently approved LNG terminals offshore of Massachusetts, to users in Massachusetts, Connecticut, Rhode Island, and eastern New York State. As currently proposed, the East to West Project would require 46 miles of new or replaced pipeline, two new compressor stations, and modifications to five existing compressor stations and 32 existing meter stations. These improvements, which would impact more than 500 acres of existing land uses including wetlands, would not allow for the flow of natural gas to New York City and Long Island markets.

OC1-106 Today, much of the gas supply for New England comes from the Gulf of Mexico, passing through New York and Connecticut on the Algonquin pipeline on its way to Boston. If additional supplies were available in either eastern Canada or Boston, it could flow through the Algonquin pipeline into the target market. Alternatively, by serving regional gas demand in New England, it could displace gas that would otherwise require Algonquin pipeline capacity to be reserved to serve New England demand. This pipeline capacity would then be available to bring in additional supplies from domestic natural gas sources, increasing the quantity of gas available for the New York and Connecticut local gas markets.

OC1-106 Please see our response to comment OC1-105.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

This capability of the pipeline system is recognized in the draft EIS, which states:

> In 1999, the Maritimes & Northeast pipeline began transporting about 0.4 bcf/d of natural gas from Nova Scotia to gas utilities and power producers in New England. Access to this reserve meant that New England was no longer at the end of all supply lines. In addition, construction of the proposed Islander East pipeline would provide regional access to the remaining capacity (about 0.3 bcfd). However, the Nova Scotia fields are relatively small, and their long-term potential is uncertain.
>
> *Broadwater Draft EIS, p.1-8*

OC1-107 While we concur that the long-term potential for local gas production in Nova Scotia is uncertain, this same infrastructure is capable of delivering gas from the Canaport LNG terminal shown in the far top right corner of the map) and the Bear Head terminal, when and if that facility comes into service. That this is the specific intention of the Canaport facility, and that the gas from Canaport will be able to reach all of the markets under consideration, is confirmed in the letter submitted to FERC by Repsol, a co-owner of Canaport:

> While the Maritimes Phase IV Project will result in an increase in capacity on the Maritimes pipeline of 0.4 bcfd, the fact is that Repsol has contracted to transport 0.73 bcfd of natural gas from the Canaport LNG terminal on Maritimes…The capacity under contract to Repsol is a combination of incremental capacity resulting from the Phase IV project and existing capacity made available to Repsol. The important fact to be considered in the Broadwater analysis is that Repsol wil be able to deliver at least 0.73 bcfd of gas sourced from Canaport LNG, into the northeastern United States pipeline grid with access to all of the markets served by that grid. It is also important to note that the Canaport LNG terminal can be expanded to provide additional incremental supply that can access the northeastern US markets, including New England and New York.
>
> *Repsol Energy North America Corporation letter to FERC, January 9, 2007*

OC1-108 In addition to the availability of gas imported through Canaport, gas supplies will be available starting as early as December 2007 from one of two LNG terminals in eastern Massachusetts, and December 2009 from the other, both of which have received all required federal and state licensing requirements, and await only final approval from the U.S. Maritime Administration. As with the Canaport facility, these terminals have an import capability which far exceeds local needs, and as with Canaport, the throughput of these terminals will serve a broader market including New York and Connecticut through the interstate pipeline system.

OC1-109 The DEIS errs in ignoring the near-term availability and deliverability of natural gas from LNG terminals in eastern Canada and Massachusetts. These supplies will be available years before the Broadwater facility could be brought on line, and the gas will be deliverable and delivered to serve demand in the New York and Connecticut markets.

OC1-107 Please see our responses to comments OC1-45 and OC1-105.

OC1-108 Please see our responses to comments OC1-45 and OC1-105.

OC1-109 The EIS did not ignore the potential of delivering gas from terminals in eastern Canada and Massachusetts. Those options were evaluated in Section 4.3.2 of the EIS. Also see our responses to comments OC1-45, OC1-105, and OC1-107.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

Response to Draft EIS comments on Synapse Report

OC1-110 The DEIS contains a discussion of the need for the project which would seem to contradict our conclusions, in addition to some specific discussion of the issues raised in our report. However, the DEIS erred in using data which is significantly out of date, particularly with respect to future growth in gas demand and gas-fired electricity generation. Many of the sources used in the DEIS were prepared as long ago as 2002 or 2003. As noted above, the gas demand outlook has changed significantly in just the past year.

OC1-111 Further, the DEIS evaluates alternatives such as energy conservation and renewable energy using extremely pessimistic and incorrect assumptions. With regard to renewable energy, the DEIS considers only renewable energy resources that are already planned or proposed, even though the Broadwater facility would be on line no sooner than December 2010,[151] and the relevant period for comparison is the decades thereafter. Quite frankly, we have more confidence in the people and the leadership of Connecticut and New York. Our assessment is that, given the increasing public awareness of the costs in dollars, national security, and damage to the climate that are associated with dependence on fossil fuels, the projections for energy efficiency and demand reduction in the Synapse Report were conservative. As evidence, we note that total natural gas consumption in New York *decreased* over the past decade, from 1.30 trillion cubic feet in 1997 to 1.16 trillion cubic feet in 2005, according to the US EIA.[152]

OC1-112 In responding to the Synapse Report, the DEIS mischaracterizes our assessment as requiring "fully implementing *all foreseeable* energy conservation measures and having *all potential* renewable energy sources online" (emphasis added) to offset 75% of anticipated gas demand growth. This is a significant misrepresentation. Our analysis was intentionally limited to efficiency measures and renewable resource penetration levels that we perceived as economically justified, likely to be implemented, and consistent with best practices in the United States.

OC1-113 The DEIS specifically addresses only one program to promote renewable energy, the voluntary approach often referred to as "green energy markets". While we agree that these have had only limited success in increasing the share of renewable resources on the grid, we note that there are much more effective approaches in place in New York and Connecticut, and throughout the United States. In the Appendix A to the Synapse Report we described Renewable Portfolio Standards (RPS) in detail, for example. These programs, mandated by state law, have proven to be much more effective than voluntary green energy markets. To date, perhaps 25 states have RPS or similar laws in place, including the New England states of Maine, Massachusetts, Rhode Island, Connecticut, and Vermont, and the Mid-Atlantic states of New York, New Jersey, Pennsylvania, Maryland, and Delaware, plus the District of Columbia. Some of these states have mandated utilities to acquire as high as 10% of their supply from renewable energy resources by 2010.

OC1-114 While the DEIS attempts to refute our assessments of the need for new gas supplies, it does so by relying primarily upon outdated forecasts from a 2002 New York State Energy Plan and a Task Force on Long Island Sound (TFOLIS) report from 2003. (A 2006 Long Island Sound LNG Task

[151] Broadwater Draft EIS, page 3.
[152] Based on data available at http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SNY_a.htm.

OC1-110 Sections 1.1.2 and 1.1.3 of the final EIS have been updated to include the most recent projections available at the time of final EIS preparation.

OC1-111 Please see our response to comment OC1-20. Although residents of Long Island, New York City, and Connecticut currently have access to "green energy programs" (which, for a price premium, inject renewable energy into the markets), these programs have not generated behavioral changes of the magnitude hypothesized. FERC further notes that while additional state-based legislative initiatives could be used to require increased conservation and use of renewable energy, our analysis cannot be based on unknown future legislation.

OC1-112 Section 1.1.5.4 of the final EIS has been updated to more accurately represent the intention of the Synapse authors.

OC1-113 Please see our response to comment OC1-20.

OC1-114 Please see our response to comment OC1-102.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-114 Force report is also cited, but no specific forecasts are referenced.) These studies are all based on gas forecasts which are completely inconsistent with the current market outlook, and which should not serve as the basis for the final EIS without substantial revision. The DEIS also relies heavily on the EIA 2005 Annual Energy Outlook gas demand forecasts which, as we have noted, have been superseded and revised sharply downwards by the forecasts in the readily available 2006 report.

OC1-115 Finally, the DEIS takes issue with our description of DSM and renewable energy as "socially preferable" to increasing reliance on imported natural gas. We use this term as a shorthand reference to a wide range of benefits that are difficult to quantify in economic terms—decreased reliance on foreign sources, geopolitical benefits, environmental and recreational benefits of avoiding industrial development in Long Island Sound, reduced impact on the environment, on human health, and on global climate. Other social benefits of renewable energy and energy efficiency programs include local job creation and increases in disposal income, at a level that we believe would far exceed such benefits associated with the Broadwater project. These are all benefits for which we believe society at large has a preference, and thus we describe the resources that confer more of them as "socially preferable."

Savings in Energy Costs

Broadwater has begun a public information campaign claiming that the presence of the proposed terminal would result in $680 million per year in reduced energy costs in New York, Connecticut and Long Island, and "median household energy cost savings" of $300 per year from 2011 to 2025. Our assessment, by contrast, was that the facility will result in little to no cost savings for the region.

Unfortunately, Broadwater has provided no substantiation of this claim,[153] so it is impossible to specifically audit or refute the arguments underlying this estimate. Nor has Broadwater presented any contractual commitment to deliver gas to consumers at a cost lower than the prevailing market price, or even to deliver the gas to Long Island Sound at all if prices are higher elsewhere. As we described in Section VI of the Synapse Report (pages 12-14), the global demand for LNG is growing faster than supply, and international price trends and tanker transport costs to Long Island Sound suggest that costs for purchasing and delivering gas to Broadwater would be high. It is thus our judgment that most of the economic benefit of this project would be claimed by gas exporting countries, and most of what is left would be claimed by TransCanada and Shell. There is little reason to believe that consumers would benefit at all.

[153] The Broadwater "Economic Benefits Fact Sheet" (http://www.broadwaterenergy.com/pdf/Fact_Sheet_EconomyFinalM.pdf) supports this with a reference to "Resource Report 5", filed under docket CP06-54 on January 30 2006. However, this report, a Microsoft Word version of which can be found at http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10945975, contains no data to substantiate this claim.

OC1-115 FERC is appreciative of the careful analysis done by Synapse and is acutely aware of the wide range of social issues related to energy production. While we appreciate the assertion by the authors of the Synapse report that they have identified socially preferable alternatives, we have not been able to identify behavioral data in support of this assertion. The authors define costs broadly to include the security, environmental issues, geopolitical risk, and all other goods and services that are foregone in the attainment of some goal. However, in consideration of that definition of costs, we do not believe that the current market behavior supports the assertion that the alternative means of supplying energy to the New York City, Long Island, and Connecticut markets would be less costly (that is, are socially preferable) relative to the proposed Project. Instead, economic theory suggests that continued demand for natural gas in the face of rising prices reflects a willingness to incur the costs associated with natural gas relative to other alternatives.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

On the other hand, the alternative resource choices discussed will unquestionably result in substantial cost savings for consumers. For example, a recent report prepared by Optimal Energy[154] concludes (footnotes omitted):

> Maintaining existing energy efficiency programs could provide cumulative annual electrical savings of 2,875 GWH by 2008 and 5,750 GWH by 2013 at a cost of 3.1 cents per kilowatt-hour (kWh). Investing in energy efficiency programs at current levels is 67 percent cheaper than the average cost to supply electricity over the analysis timeframe – or 9.4 cents per kWh – represented by the avoided electric supply cost for the region. The implementation of building energy codes will further reduce load growth with an estimated annual electrical savings of 509 GWH by 2008 and 1,090 GWH by 2013 at a cost of 2.9 cents per kWh. The most cost-effective means of offsetting load growth is through minimum efficiency product and appliance standards, which cost only 1 cent per kWh and will save 643 GWH by 2008 and 2,284 GWH by 2013.

Energy efficiency is a way to meet the region's energy needs at a fraction of the cost of additional energy supplies; importing LNG from a seller's international market, and selling it at the prevailing market price for natural gas in the northeastern United States, is not.

Conclusions

We find that the conclusions reached in the March, 2006 Synapse Report have withstood, or been strengthened by, developments since its release. In particular, we find that projected demand for natural gas is lower, the potential and likely role for energy efficiency and combined heat and power is greater, and the prospects for competing LNG import facilities are stronger than they were at the time we issued the report.

OC1-116 We further find that the analysis in the DEIS is inadequate in several important ways. First, it is based on outdated forecasts of gas demand which have been clearly rendered obsolete by well-documented and readily available updates. Second, it severely underestimates the not just the potential but the existing role of demand management and renewable energy in serving the region's energy needs, while at the same time neglecting the cost benefits of these resources over imported natural gas. Third, it erroneously mischaracterizes both the availability and the deliverability of natural gas to the New York and Connecticut markets from eastern Canadian import terminals, through the M&N and Islander East pipeline systems. Fourth, it entirely disregards the recent likely construction of two additional LNG import facilities in Massachusetts, which will serve the broader northeast market including New York and Connecticut.

Finally, we find that there is no basis in fact for Broadwater's contention that the project will result in energy cost savings for consumers, while there is considerable evidence for substantial cost savings associated with demand management investments.

[154] "Economically Achievable Energy Efficiency Potential in New England", prepared by Optimal Energy for the Northeast Energy Efficiency Partnerships, Inc., as revised in May 2005. Available on-line at http://www.neep.org/files/Updated_Achievable_Potential_2005.pdf.

OC1-116 We have addressed each of the concerns stated by the commentor in our responses above to the specific comments.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

On the basis of this analysis, we conclude once again that the proposed Broadwater facility is not and will not be required by the present or future public convenience and necessity, because prudent, feasible and preferable alternatives to the Broadwater Proposal are available. The proposed Broadwater terminal is simply not the answer to the region's current or projected energy needs.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

CoastalVision

Informing Your Decisions

January 22, 2007

MEMORANDUM

To: Save the Sound
From: Drew A. Carey, Ph.D
Principal Scientist, CoastalVision
RE:
OEP/DG2E/Gas Branch 3
Broadwater LNG Project
Docket No. CP06-54-000
CP06-55-000

Comments on Draft Environmental Impact Statement
Broadwater LNG Project
FERC/EIS - 0196D
November 2006

I have reviewed the November Draft Environmental Impact Statement (DEIS), the Resource Reports and the USCG Waterways Suitability Report. These reports were available online through the associated docket numbers referenced above.

My assessment focused on the following Sections and associated Resource Reports:
2.1 Proposed Facilities
2.3 Construction Procedures
2.4 Operation and Maintenance
2.5 Schedule
2.6 Environmental Compliance Inspection and Mitigation Monitoring
3.1 Geology and Soils
3.2 Water Resources
3.3 Biological Resources
3.4 Threatened and Endangered Species
3.7 Marine Transportation and Onshore Traffic
3.11 Cumulative Impacts
4.4. Alternative LNG Terminal Designs and Locations
4.5 Pipeline Route Alternatives
4.6 Pipeline Construction Alternatives
Resource Report 1 - General Project Description
Resource Report 2 - Water Use and Quality
Resource Report 3 - Fish, Vegetation and Wildlife
Resource Report 6 - Geological Resources
Resource Report 7 - Soils
Resource Report 10 - Alternatives
Environmental Sampling Report

215 Eustis Avenue, Newport, Rhode Island 02840 tel 401 849 9236 fax 9237 coastal.vision@verizon.net

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

I received a Ph.D in Geology and Marine Ecology from the University of St. Andrews, Scotland in 1982, was an Assistant Professor at Wesleyan University and have worked as a marine environmental consultant since 1991. I have served as the principal author on numerous resource reports, EIS sections and monitoring for siting and management of dredged material disposal sites in Long Island Sound, Rhode Island Sound, Narragansett Bay, Buzzards Bay, Massachusetts Bay, and the Gulf of Maine. I have conducted public workshops, public outreach to fisherman and resource users, resource use surveys, scientific surveys, siting feasibility studies, geological, biological and physical oceanographic assessments in Long Island Sound and New England waters since 1982. I am familiar with the processes of: scoping, conducting site assessments, determining existing conditions, predicting potential impacts, conducting alternatives analysis and recommending mitigation, monitoring and compliance.

Major Conclusions

OC1-117 During my review of the project documents, I identified deficiencies and inaccuracies in the supporting documents (Resource Reports, here referred to as RR #) and DEIS, deficiencies in the data collection and analysis, inappropriate and misguided use of primary and secondary scientific information and unsupported conclusions. I noted several inconsistencies between the DEIS and the associated Resource Reports. The most serious omission was the lack of a detailed and supportable alternative siting analysis for the LNG import terminal and pipeline. The siting process did not consider sufficient feasible alternatives, reduced the terminal sites to one without sufficient assessment of environmental impacts or consideration of engineering alternatives, did not collect sufficient data to evaluate alternatives and rejected alternatives without due cause. Another serious omission is sufficient environmental data to conduct predicted impact analyses (modeling) on benthic habitats, water quality and pelagic resources, particularly fish.

I conclude that the DEIS and supporting documents have not met the minimum standard for determining the environmental impacts of the Project and have failed to properly evaluate alternative sites for the marine-based LNG import terminal and pipeline. I recommend a revision of the DEIS to correct deficiencies and inaccuracies and an alternatives analysis that examines feasible sites for the import terminal, collects data on existing conditions and subjects the alternatives to weighted quantitative assessment of relative environmental, engineering and socioeconomic impacts of each alternative.

OC1-118 I have noted several areas near the proposed gas transmission line that, based on available credible data, might provide locations for an LNG import terminal that meet engineering requirements and with far less environmental impacts from pipeline installation. These areas are slightly closer to population centers than the proposed location but retain a buffer of 4.7 miles from the shoreline and have potentially less interference with shipping lanes, and some harvesting activities (trawling).

OC1-117 We have provided specific responses to the specific questions provided below to support this conclusion. In general, the final EIS has been updated to address the specific technical comments that are germane to our environmental review (including environmental setting and potential impacts).

OC1-118 As described below, we have provided specific responses to the commentor's specific questions and recommendations regarding alternative LNG terminal locations and pipeline routes.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

The primary deficiencies and inaccuracies I found are:

OC1-119 ☐ The proposed facilities description does not include sufficient detail of contingencies for the geotechnical properties of the sediments underlying the proposed mooring. The presence of deltaic deposits and the thickness of glacial lake sediments and that might be disturbed by earthquakes must be determined with seismic lines run through potential FSRU locations.

OC1-120 ☐ The construction procedures description does not provide sufficient detail on calculation of pipeline placement disturbance on benthic habitats.

OC1-121 ☐ The operation and maintenance description does not provide sufficient detail on delivery of natural gas to the pipeline (maintenance of pressure, temperature) or on any effects of changes in the pipeline elevation throughout the length of the pipe.

OC1-122 ☐ Environmental Compliance Inspection and Mitigation Monitoring Section lacks any detail of planned monitoring activities to ensure proposed mitigation actions are conducted and deemed effective.

OC1-123 ☐ Description of sediment chemistry results from USGS studies are incorrectly presented in figures presented in the DEIS (Figures 3.1-2 to 3.1-4) and in RR 2 (Figures 2-7a to 2-7d). The results in the figures are circles cut out of a coarsely contoured surface from USGS sediment sampling including the contour and grid lines. There is no fathomable reason not to present the actual sample sites of both the USGS data and the limited sampling conducted by Broadwater. To present windows cut out of a contoured map is misleading and almost impossible to interpret. The actual crudely rendered contour maps are presented in RR 10 (Figures 10-17 to 10-23).

OC1-124 ☐ NY State Sediment Sample locations are shown but the data is not presented.

OC1-125 ☐ Minimal details were provided about the sampling protocols for sediment samples except in the Environmental Sampling Report (sediment horizon, etc.). Decoding the methods and results is very difficult but it appears that sediment chemistry was conducted on composited cores of between 3 and 9 feet in length with the top one foot not sampled. If this is the case it is not surprising that the chemistry results were so low. The majority of elevated levels of contaminants would be expected in the top foot. It appears that the study relied upon the contoured USGS results to characterize the surficial sediments and used composited cores as a comparison. This is a grossly neglectful approach to characterize the potential impact of excavating sediments with a plow. Sampling efforts should provide assessment of the surficial sediments (top ten centimeters) within any proposed corridor and composited results to the projected depth of trenching. The surficial sediments are the sediments most likely to be resuspended during plowing and backfilling and contribute to potential water quality issues.

OC1-126 ☐ Non-detects of any PAHs in any sample is highly unusual in fine-grained sediments. Average Cadmium values in the Sound are 0.11 ppm and 0.17 in fine-grained sediments (Mecray and Buchholtz ten Brink 2000). The detection limits reported in Appendix C RR 2 for Cadmium and Silver exceed the average values reported by the USGS for ALL samples, so the lack of detection in the samples is meaningless. The laboratory methods were not sufficiently rigorous to provide any meaningful data and raise questions about the PAH analyses and detection

OC1-119 Section 3.1.1.3 of the final EIS has been updated to provide more detail on the geologic setting at the proposed YMS site, as well as additional information on YMS installation methods as it relates to geology.

OC1-120 Sections 2.3.2 and 3.1.2.2 of the final EIS describe the pipeline construction procedures as they relate to seafloor disturbance.

OC1-121 Section 2.4.2 of the final EIS describes operation and maintenance of the proposed pipeline. Sections 3.2.2.1 and 3.3.1.2 of the final EIS provide an updated discussion of the potential temperature impacts associated with pipeline operations. While this temperature analysis is based on maximum temperatures of the natural gas (which is directly related to operating pressure), there is no additional discussion of operating pressure or elevation because it is not directly related to our environmental review.

OC1-122 Section 5.2 of the final EIS includes a recommendation requiring the use of environmental inspectors. These inspectors will be empowered to order corrective action (including stoppage of work) if conditions specified in the final EIS are not met.

OC1-123 Figures 3.1-2 to 3.1-4 in the draft EIS have been updated in the final EIS (Figures 3.1-3 to 3.1-5) to depict baseline sediment chemistry concentrations along the entire proposed pipeline route based on USGS sediment surveys (Mecray et al. 2000).

OC1-124 This comment appears to be related to a map in a Broadwater document and is not pertinent to the contents of the EIS.

OC1-125 The sediment sampling protocol and laboratory results are publicly available in the FERC docket for the Broadwater Project (Docket No. CP06-54-000, Accession #20060130-4018). Section 3.1.2.1 of the final EIS has been revised to clarify that the top 1 foot of sediment in each core was included in the samples sent to the laboratory for analysis.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-126 limits. The entire sediment sampling program and laboratory analysis should be repeated in the proposed route and with at least one additional alternate route to characterize surficial sediments and distribution of sediments and contaminants to the proposed trenching depth.

OC1-127 ☐ The results of the sediment analyses were used to eliminate consideration of chemical impacts of sediment disturbance. These results as presented are not sufficient to eliminate contaminant levels from sediment resuspension modeling with any confidence. The sediment concentrations and grain sizes present in the bioturbated fine sediments at the seafloor surface must be adequately characterized and entered into the resuspension modeling.

OC1-128 ☐ Sediment chemistry results from USGS were used selectively in Alternatives analysis (see below).

OC1-129 ☐ Conclusions regarding potential influence of sewage or other storm water related contaminants based on one day of water column sampling are unsupportable. Fecal coliform and enterococci levels are highly sensitive to rainfall and runoff through combined sewer overflows and storm water discharge.

OC1-130 ☐ The description of the general setting and geological context of Long Island Sound is insufficient in detail and lacks recognition of recent professional publications (e.g. Stone et al. 2005, Poppe et al. 2002). Available maps of thickness of glacial lake clays and deltaic deposits and seismic data presented in these recent references should be used in preliminary siting of the FSRU structure and followed with site-specific seismic (sub-bottom) characterization of the underlying geological structure.

OC1-131 ☐ The description and analysis of potential geological hazards from faults and earthquakes is inadequately researched (it is based on personal communication and review of a general database). John Ebel of Weston Observatory and Janet Stone of the USGS should be consulted to assess the geologic hazards in the siting area.

OC1-132 ☐ There is a discrepancy in the proposed pile depth between documents (DEIS 165 feet, RR 6 230 feet) and no detailed analysis of the thickness and nature of glacial deposits in site selection criteria (RR 7 includes map but no discussion of the significance of the nature and thickness of sediments on FSRU site location).

OC1-133 ☐ No discussion of the significance of elevation over Stratford Shoal on pipeline pressure calculations (see Figure 7-5b in RR 7).

OC1-134 ☐ The location and significance of historical dredged material disposal sites to site selection and pipeline routing lacks consideration of two sites with recent data on sediment chemistry and biological resources (Bridgeport and Milford in EPA/USACE 2004). Milford is missing entirely from maps and analyses despite a location directly on an alternate pipeline route. There is an additional historic dredged material disposal site (Bridgeport East) referenced in the same document.

OC1-135 ☐ The impacts of impingement and entrainment of ichthyoplankton and some larger organisms and impacts of discharge of water with sodium hypochlorite has been grossly underestimated. No consideration was made of intake, screening and discharge effects of LNG tankers. The flow rates and screen size of both carriers and the terminal are likely to damage or kill substantially greater numbers of larvae, juvenile fish and invertebrate species than estimated in the documents.

OC1-126 Prior to undertaking the field activities, Broadwater prepared and submitted a sampling and analysis plan to regulatory agencies in order to provide them the opportunity to comment on and, if appropriate, request modifications to ensure the adequacy of data for the agency review. Sediment concentrations were assessed relative to NYSDEC's Technical and Operational Guidance Series 5.1.9 sediment criteria as a screening benchmark. These criteria are more than 10 times higher than the detection limits reported for PAH compounds. Although detection limits for some samples may approximate effects range-medium values, none of the sample results approach these values. Several metals, including antimony, cadmium, selenium, silver, and thallium, were not detected in any of the samples collected. The detection limits for silver and cadmium are substantially lower than the respective effects range-low values for these elements. While the detection limits for these elements may be several times higher than those reported by USGS, it does not change the conclusion that these concentrations are below ecological threshold concentrations. The sediment protocol and laboratory results have satisfied federal and state resource agencies with regulatory responsibility.

OC1-127 The sediment sampling protocol and laboratory results have satisfied federal and state resource agencies with regulatory responsibility.

OC1-128 While sediment chemistry was one of the considerations in the alternatives analysis, the determination that the alternative routes were not environmentally superior to the proposed route was based primarily on the inability to deliver gas through the IGTS pipeline without additional compression facilities in Long Island Sound.

OC1-129 We agree. Thus, those results are not discussed in the EIS, and no conclusions were based on Broadwater's sampling data for fecal coliform and enterococci.

OC1-130 Thank you. Section 3.1.1.1 of the final EIS has been updated to incorporate the suggested references.

OC1-131 hank you for the suggestion. Section 3.1.1.3 of the final EIS has been updated with information by Dr. Ebel and Dr. Stone.

OC1-132 Section 3.1.1.3 of the final EIS has been clarified regarding the pile depth.

OC1-133 The final EIS does not mention the elevation of Stratford Shoal as it relates to pipeline pressure because the gas pressure in the pipeline is based on the required pressure at the IGTS interconnect, and the elevation is not germane to our environmental review.

OC1-134 Section 4.5.2 of the final EIS discusses the Bridgeport and Milford dredged material disposal sites as part of the analysis of pipeline route alternatives.

OC1-135 Thank you for your comment. Section 3.3.2.2 of the final EIS provides the estimated number of ichthyoplankton that would be impinged and entrained as a result of the proposed Project, including berthed LNG carriers. In addition, Section 3.3.2.2 of the final EIS has been expanded to more fully discuss potential biological impacts of water discharges.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-136

- The discharge of ballast water treated with sodium hypochlorite represents a high seasonal risk to planktonic larvae (lobsters, shellfish, finfish). The calculation of total chlorine release and an accompanying water quality monitoring plan should be included in the FEIS.

OC1-137

- The benthic community assessment is completely inadequate. "Benthic communities" are described entirely from a video drop camera survey and supplemented with dominant species from grab sample data. The community descriptions are broad meaningless characterizations based on isolated observations of organisms and sediments visible in video camera sweeps. Modern benthic community assessment utilizes quantitative data, species-level identification and multivariate statistical analysis. The only quantitative assessment is summary statistics of benthic species found in grabs. This assessment is used to assert that no live individuals of shellfish (hard clams, surf clams and oysters) were observed and thus conclude that densities must be low. The benthic data presented in DRR-3 Appendix C reveal that many samples contain individuals identified as *Mercenaria mercenaria* (hard clams) which are likely to have been small or juvenile specimens but potentially part of a larger harvestable population. The species lists are deficient as many groups of individuals are only identified to the family or genus level which can affect calculations of diversity and richness.

OC1-138

- The assessment of impacts due to anchor scars, cable sweep and pipe lay barge positioning is perfunctory (see below).

OC1-139

Impacts due to pipeline installation

Benthic disturbance during construction is a combination of installation of the YMS, installation of the pipeline, cable crossings and installation of the interconnection to the IGTS. Broadwater estimates that the pipeline installation processes would disturb a total of 2,020 acres of seafloor from the use of anchors (cable sweep and anchor footprints) and trenching along the seafloor (RR 10 Table 10-17). The DEIS suggests that the use of mid-line buoys or a dynamically positioned lay barge would virtually eliminate the majority of the acres of this impact but Table 10-17 in RR 10 (January 2007) utilizes the 2020 acre figure as the impact *with* midline buoys. No detailed evidence is presented to explain the discrepancy between these two figures or how they were calculated.

This is broken down as follows in the DEIS

Installation activity	Disturbance area
Cable sweep	2,020 acres
Plowing	179.1 acres
Specialized trenching methods	18.2 acres
Anchors	18.2 acres
Total	2235.5 acres

OC1-140

Table 10-17 defines the installation technique as 8-point mooring, 3 anchor sets/mile for 1 lay, and 2 plow passes with midline buoys on the quarter anchor cables. Without midline buoys the total disturbance is calculated as 6,910 acres. The removal of 4,890

OC1-136 Section 3.2.3.2 of the final EIS has been expanded to more fully discuss potential impacts of water discharges. In addition, the draft Water Quality Monitoring Plan provided by Broadwater has been included (as Appendix I) in the final EIS. Total residual chlorine would be one of the parameters monitored to ensure compliance with the requirements of the SPDES permit.

OC1-137 While the EIS did not characterize the benthic community based on video results, Section 3.3.1 of the final EIS has been updated to more completely characterize the benthic community based on existing literature for Long Island Sound and site-specific benthic sampling.

OC1-138 The final EIS has been updated to provide a more complete discussion of anchoring and cable sweep, including the results of a technical review conducted subsequent to the draft EIS.

OC1-139 Section 3.1.2.2 of the final EIS has been updated with the results of a third-party review of the existing information on the potential use of mid-line buoys and dynamically positioned lay barges to reduce seafloor impacts.

OC1-140 We explicitly did not base the findings of our EIS on those values. Section 3.1.2.2 of the final EIS has been updated to incorporate the third-party review of existing pipeline installation monitoring with and without mid-line buoys.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-140 acres of disturbance is not supported by documentation from other pipeline installation projects that have been monitored.

The subsea plow is expected to create a 25 foot wide trench with a 25 foot wide pile of excavated sediment on either side (75 foot wide swath of disturbance). The DEIS recommends backfilling of the trench with excavated material to enhance recovery of benthic communities.

Broadwater proposed backfilling over 2 miles of the trench with imported rock material (IGTS tie-in, valves and the 2 miles of pipeline closest to the FSRU. They also propose concrete armoring at utility crossings and at Stratford Shoal. The backfilling of imported rock and armoring with concrete represents a conversion of natural sediments to either coarse angular rock or hard bottom (concrete).

Installation activity	Disturbance area
Backfilling trench with imported rock	6.6 acres
Backfilling Shoal crossing	5 acres
Concrete armoring at utility crossings	0.8 acres
Total	12.4 acres

OC1-141 **Anchor and cable sweep:** The DEIS recommends midline buoys to "virtually eliminate" cable sweep disturbance. RR 10 asserts that Broadwater is aware of no documented evidence that would substantiate claims of unacceptable long-term impacts from anchors or cable sweep. However monitoring reports on pipeline laying projects that have used midline buoys do not report a "virtual elimination" of the disturbance and suggest that anchor and cable scars can produce substantial bottom disturbance (CTDEP 2006). A report prepared from a post-pipeline ROV and sidescan sonar survey off the Florida coast in the Gulf of Mexico described cable footprints leading away from anchor depressions 1-3 feet wide and 4-12 inches deep with an average length of 2,033 feet. Sidescan sonar results indicated that the cable footprints increased to an average of 3,014 feet without midline buoys. Multibeam surveys of Long Island Sound seafloor areas within the siting area document bottom scars persisting for decades (Poppe et al. 2006). No post-pipeline survey results have been presented that support the calculation of 2,020 acres of disturbance with midline buoys versus 6,910 acres without. No post-pipeline monitoring surveys have demonstrated full recovery of benthic habitat in the trenches, anchor or cable scars or excavated sediments.

OC1-142 **Backfilling and recovery of trenches:** The DEIS recommends mitigating benthic disturbance by backfilling trenches with excavated material. Efforts to restore benthic habitats after pipeline placement in New England waters have failed to demonstrate success in backfilling, natural infilling or recovery of the benthic habitat (Iroquis, Eastchester Lateral, Hubline, see DEIS page 3-43). Extensive surveys at dredged material disposal sites in the Central Basin of Long Island Sound reveal that minor physical disturbances of the soft seafloor remain detectable as much as 30-40 years after the event. Indeed, there is no existing evidence that an installation project in New England has successfully installed cable or pipelines and restored the benthic habitat to

OC1-141 The final EIS has been updated based on a third-party assessment of mid-line buoy use during construction of the Broadwater Project. Of interest, the technical reviewers are the scientists that conducted the post-construction monitoring for the project mentioned in the Gulf of Mexico. In addition, Section 3.1.2.2 of the final EIS has been expanded to more completely describe successes and failures regarding backfilling and post-construction benthic recovery for previous linear projects in Long Island Sound.

OC1-142 As mentioned above, Section 3.1.2.2 of the final EIS has been expanded to more completely describe successes and failures regarding backfilling and post-construction benthic recovery for previous pipeline projects in Long Island Sound. In addition, we have included a recommendation for backfilling methods and post-construction success to be developed in coordination with appropriate federal and state resource agencies with the technical expertise and historical knowledge to avoid and minimize potential long-term impacts associated with some other projects.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-142 prior existing conditions. It must be assumed, without supporting evidence to the contrary, that any impacts from installation of the proposed pipeline will be permanent. It is critical that all due diligence be performed to document the habitats disturbed and minimize the length and place the pipeline in habitats most likely to absorb trenching activities with minimal harm.

OC1-143 **Natural recovery of disturbed sediments:** The DEIS cites the impacts and recovery within dredged material disposal areas in Long Island Sound as evidence that backfilled trenches could recover. The work cited is but a small part of over thirty years worth of management, monitoring and assessment of potential impacts of disposal of material dredged from harbors in Long Island Sound and placed at several designated disposal sites in the depositional areas of the Sound. Studies of recovery of disposal mounds is based on examining the surface sediments of the mounds (generally harbor sediments) and tracking the recolonization of benthic organisms. The mound profiles are gentle slopes with relatively soft sediments that are sufficiently similar to ambient sediments that recovery occurs within a few months to up to 1 to 2 years. These studies are not comparable to the observed impacts of pipeline placement where sediments have been displaced and left with trenches, piles and scars on the seafloor. The Newell et al. (1998) citation is also not highly relevant to the expected impacts associated with pipeline placement. The reference describes dredging activities in the United Kingdom and European waters. The altered topography of the pipeline placement disturbance has been demonstrated to have interactive effects with sediment movement (scour and deposition) resulting in a permanent alteration of the habitat characteristics. Post pipeline placement studies have not demonstrated a comparable recovery in disturbed sediments or any success in remolding a smooth topography to restore the original habitat conditions. The lack of peer-reviewed or technically substantive studies of post-pipeline placement recovery in New England waters is testimony to our lack of knowledge of the processes involved.

OC1-144 **Rock placement and concrete:** The DEIS asserts that the conversion of soft substrate to rock or concrete would improve habitat diversity and increase habitat for some epibenthic species. They refer to potential substrate for oysters, barnacles and mussels, none of which are found at the depths and habitats proposed for the concrete pads. Substitution of imported rock or concrete for existing mobile substrates (sand, gravel, sandy silt) does represent a permanent habitat conversion. It represents an opportunity to introduce non-native species into relatively deep water habitats in Long Island Sound (on the YSF, FSRU and concrete and rock substrates. The near-continual presence of large volumes of ballast water from LNG tankers provides a direct vector for introduction of non-native species.

FSRU and Pipeline Route Alternative Analysis

OC1-145 The alternatives analysis of the specific locations of the floating storage and regasification unit (FSRU) and the 24" pipeline connecting to the Iroquois gas transmission system (IGTS) were unnecessarily restrictive and lack documented assessment of the engineering, environmental, and socioeconomic advantages associated

OC1-143 Sections 3.1.2.2 and 3.3.1.2 of the final EIS have been updated to more completely describe the existing literature on recovery of the seafloor and associated benthic communities.

OC1-144 Section 3.1.2 of the final EIS has been updated to describe mitigation measures to minimize sediment conversion, including a recommendation to develop a backfilling plan to minimize conversion of softbottom sediments along the 2 miles of trench to rock. As stated in Section 3.2.3.2 of the final EIS, LNG carriers would not discharge ballast water into Long Island Sound; thus, there would not be any vector for invasive species via LNG carrier ballast.

OC1-145 Sections 4.4.2 and 4.5.2 of the final EIS consider a number of variables in evaluating the potential environmental impacts of both the proposed and alternative LNG terminal locations and pipeline routes. The comment is correct in that locating the FSRU and sendout pipeline 8 to 10 miles west of the proposed location would shorten the length, and associated construction impacts, of the pipeline needed to tie-in with the existing IGTS pipeline. However, the sendout pipeline would tie into the IGTS pipeline much farther upstream than would the pipeline location proposed by Broadwater. Section 4.5.1 of the final EIS explains that, in order to transport significantly more natural gas through this pipeline from a point closer to Connecticut south to Long Island and New York City, the IGTS pipeline would need to be modified to increase its volume. Further, additional onshore or offshore compression would need to be added to push a larger volume of gas through the IGTS pipeline at a sufficient velocity. By placing additional natural gas that is under pressure near the IGTS pipeline terminus, the proposed Project would provide natural gas directly or via displacement to all three markets while avoiding the environmental impacts associated with IGTS upgrades and construction of additional compression facilities. Finally, an FSRU sited in Connecticut waters would result in greater visual impacts to Connecticut coastal residents than the location proposed by Broadwater.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-145 with alternate locations. The rationale for the pipeline route appears to be primarily jurisdictional, with extraordinary efforts to keep the pipeline in New York waters despite substantial environmental and engineering obstacles. The FEIS must include environmental sampling and engineering analysis of alternate routes that could substantially reduce the impact of pipeline installation through either relocation of the FSRU or realignment of the pipeline to a tie-in point east of Stratford Shoal Middle Ground Complex (Figures 2 and 3).

The DEIS considers five route alternatives to connect the FSRU with the IGTS pipeline. This analysis is based largely on Resource Report No. 10 (RR-10). The criteria used in the analysis include pipeline length, presence of shallow bedrock, number of utility crossings, hazards, need for IGTS system upgrades, potential for encountering contaminated sediments, offshore locations, and need for onshore pipeline construction.

Initially all route considerations were within New York State waters and merely described slightly different paths between the selected location of the FSRU and the IGTS tie-in location deemed to be the preferred interconnection point (MP 18.2). The preferred FSRU location and interconnection point requires the new pipeline to cross the shallow hard ground (gravel, boulders, coarse sand) habitats of the Stratford Shoal Middle Ground Complex and connect with the Iroquois pipeline (IGTS) in the Western Basin of Long Island Sound. This pathway traverses at least five distinct benthic habitats including erosional and hard bottom habitats. This pathway also requires complex dredged trenching and engineered fill to cross the Stratford Shoal Middle Ground Complex (RR-1, Appendix C Stratford Shoal Contingency Plan).

OC1-146 The initial consideration of FSRU location and the pipeline interconnection point severely restricted any possible alternatives. All detailed geological and biological data was collected along one broad "route" through which several "alternatives" were considered (RR 3 and RR 10). These did not represent any alteration in the tie-in point or location of the FSRU. Broadwater has resisted any subsequent requests to evaluate alternative locations of either the FSRU or the tie-in point.

Following expiration of the Connecticut Moratorium on energy projects in the Sound (RR-10, § 10.6.2, Moratorium C.G.S. § 25-157) an additional route was considered that would connect with the IGTS at MP 7.0. This North Route Alternative (Route 5 in RR-10) was the only alternative considered that traversed Connecticut waters or evaluated a different tie-in from MP 18.2.

Despite the fact that the North Route would avoid crossing the Stratford Shoal Middle Ground Complex (an area that presents difficulties with pipeline laying and benthic resources) and result in 9.3 miles less pipeline placement, this alternative was rejected. The grounds for rejection were the apparent need for an IGTS upgrade to maintain flow rate; concern for benthic communities and concern for potentially higher contaminant levels in sediments.

OC1-147 No alternative locations for the FRSU in Connecticut waters were considered. The "selected site would need to demonstrate environmental, engineering, and socioeconomic

OC1-146 Please see our response to comment OC1-145.

OC1-147 Please see our response to comment OC1-145.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-147

preference with respect to the existing site" (RR 10, p.10-45). Several sites meet these criteria in water depths greater than 45 feet that have no greater impact on established shipping routes than the proposed location (see Figures 3.7-1, -2 in DEIS). Moving the FRSU 8-10 miles due west places the site in Connecticut waters but does not interfere with shipping routes and has the substantial environmental benefit of eliminating up to 16 miles of pipeline installation impacts (Figures 2 and 3).

There are serious deficiencies in this brief alternatives analysis (DEIS § 4.5.2.1).

OC1-148

1. The analysis of the tie-in point suggests that the greater length of 24 inch pipe (IGTS) from MP 7 to New York would result in a pressure drop for the North Route alternative compared to the preferred alternative. A Broadwater hydraulic analysis suggests as much as 36% reduction in the physical delivery capability to the preferred New York City market and 42% reduction in physical delivery to the preferred Long Island market. This hydraulic analysis is based on the proposed FRSU location and does not consider any alternatives to compare hydraulic performance. The only resolution to this pressure drop suggested is a 20 mile 24 inch pipeline loop and an onshore compressor. This is a simplistic assessment. Pipeline looping is undertaken to increase the flow rate of gas pipelines, looping effectively increases the pipe diameter (Menon 2006). A shorter 30 inch pipeline could be combined with much shorter pipe loops to increase net flow rate. Calculations should be made to compare relative efficiencies of pipelength, elevation and pressure drop for each alternative. No consideration was given to any alternatives to compensate for the existing 24 inch line such as locating the FRSU closer to the pipeline or any other alternative connection configurations that might reduce the pressure drop.

OC1-149

2. The analysis asserts that the North Route "would traverse areas reported by USGS (1998) to have a higher density and diversity of marine benthic communities that those found in the more central parts of Long Island Sound". The apparent reference is to Zajac (1998) in Poppe and Polloni (1998) which does not support this statement. This reference compiles and analyzes benthic community data collected in 1972, 1973 (Reid, 1979) and 1981 and 1982 (Pellegrino & Hubbard, 1983). Of these studies, only the early 70's data includes any samples in New York waters that would allow comparison of proposed routes (Figure 1). This very generalized map depicts a low diversity community in the Central Basin with higher diversity groups on shoals and in nearshore waters that contradicts the statement in the DEIS. It is negligent to make sweeping conclusions about potential environmental effects from a reconnaissance survey conducted thirty years ago. Although there are no subsequent comprehensive benthic assessments in Long Island Sound, Zajac has demonstrated from many smaller studies that viewed from a landscape scale (10's of km^2) the benthic communities are most closely associated with a combination of sediment types geographic location and water depth (Zajac et al. 2000). In the absence of better evidence, it is more effective to predict benthic habitat complexity based on sediment type, regional location and depth and follow up with site-specific sampling of benthic processes and habitat characterization. The benthic assessment provided in RR 3 is entirely inadequate for this task and limited to one potential route.

OC1-148 Please see our response to comment OC1-145.

OC1-149 Reference to and conclusions based on USGS (1998) have been removed from Section 4.5.2 of the final EIS.

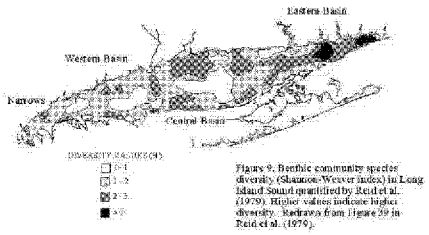


Figure 9. Benthic community species diversity (Shannon-Weiver index) in Long Island Sound quantified by Reid et al. (1979). Higher values indicate higher diversity. Redrawn from Figure 39 in Reid et al. (1979).

Figure 1 from Zajac 1998.

Based on sediment types, sedimentary environments and depth, Route 5 traverses a much lower number of sediment types (80 % of the route is in Sandy Silt, Clayer Silt, or Silt), avoids gravelly sand and boulder areas; avoids erosional sedimentary environments; crosses the same depth range in comparison to Route 2 (Table 10-13 in RR-10).

OC1-150

3. The Resource Report (RR-10) argues that Route 5 is in an area influenced by discharge from the Housatonic River and is therefore more highly contaminated. The IGTS passes through an area that is within the historical plume of the Housatonic River and this area generally has higher concentrations of some metals (Hg, Pb, Zn, Cr). The proposed route could be modified to minimize exposure to the highest areas of concentration. The USGS data contoured in Figures 10-17 to 10-20 displays moderately elevated metals at several locations but there are stations with much lower levels that are not evaluated. For example, if the FSRU was located in the western end of the Central Basin and a pipeline was routed NNW to the eastern margin of Stratford Shoal, the metals contents of the sediment are likely to much lower than presented in RR 10. Studies conducted at the Milford Historical Disposal Site (EPA/USACE 2004) which straddles Route 5 east of the IGTS indicate that sediment contamination within the site and at an adjacent reference area was lower for all metals than the USGS samples analyzed in RR-10 (Table 10-12). The reported levels were slightly elevated over average depositional area values in Long Island Sound.

OC1-151

4. The alternatives analysis does not conduct sufficient due diligence in the assessment of Route 5 to evaluate the balance between reduction of disturbance from 9.3 miles of pipeline construction and any potential increases in environmental effects associated with specifics of the alternative Route. Sampling was only conducted along the preferred route which does not permit an equivalent assessment of potential impacts of alternatives.

OC1-152

There are several sources of detailed data that would permit consideration of actual alternatives with potential to minimize environmental harm (Poppe et al. 2002, McMullen et al. 2005, Poppe et al. 2006, EPA/USACE 2004, Stone et al 2005). With some flexibility in the location of the FSRU, two of the cable crossings and the shoal

99

OC1-150 Pipeline route alternatives were evaluated against a variety of criteria, including environmental impacts and gas deliverability constraints. Please see our response to comment OC1-145.

OC1-151 Please see our response to comment OC1-150.

OC1-152 As described, we have provided specific responses to the commentor's specific questions and comments regarding an alternative LNG terminal location and pipeline route alternatives within Long Island Sound.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

OC1-152 crossing could be avoided and several routes could be investigated that would remain almost entirely in the soft sandy silts of the Central Basin (Figures 2 and 3). This is a habitat with relatively wide distribution and proven response to sediment disturbance (SAIC 1995, 2002; Fredette and French 2004). Most importantly, the total pipeline length required could be reduced to as little as 4 miles, substantially reducing the known ecological effects.

OC1-153 The DEIS and associated Resource Reports, as submitted, are inadequate to permit assessment of environmental impacts associated with the construction of an LNG intake terminal and connection to the IGTS. An alternatives analysis with appropriate and scientifically defensible data collection and analysis of all alternatives considered must be conducted before proceeding to a Final Environmental Impact Statement.

References.

CTDEP 2006. RE: Water quality Certification Application #200300937-SJ Islander East Pipeline Company, LLC. Memorandum from Gina McCarthy CTDEP Commissioner to Islander East Pipeline Company, LLC. See also DEP R. 124 cited in memorandum.

EPA/USACE 2004. Final Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Central and Western Long Island Sound, Connecticut and New York.

Fredette, T.J. and French, G.T. 2004. Understanding the physical and environmental consequences of dredged material disposal: history in New England and current perspectives. Mar. Poll. Bull. 49: 93-102.

Knebel, H.J. and Poppe, L.J. 2000. Sea-Floor Environments within Long Island Sound: A regional overview. Journal of Coastal Research, 16(3), 533-550.

McMullen, K.Y., Poppe, L.J., Paskevich, V.F., Doran, E.F., Moser, M.S., Christman, E.B., and Beaver, A.L. 2005. Surficial Geologic Interpretation and Sidescan Sonar Imagery of the Sea Floor in West-Central Long Island Sound. U.S. Geological Survey Open-File Report 2005-1018.

Menon, E.S. 2007. Gas Pipeline Hydraulics. 58 pp. ENGnetBase, a CRCnetBase product, Taylor and Francis Group.

Pellegrino, P. and Hubbard, W. 1983. Baseline Shellfish Data for the Assessment of Potential Environmental Impacts Associated with Energy Activities in Connecticut's Coastal Zone. Volumes I & II. Report to the State of Connecticut, Department of Agriculture, Aquaculture Division, Hartford, CT. 177p.

Poppe, L.J., Paskevich, V.F., Lewis, R.S., DiGiacomo-Cohen, M.L. 2002. Geological Framework Data from Long Island Sound, 1981-1990: A Digital Data Release. U.S. Geological Survey Open-File Report 02-002.

OC1-153 As described in our responses above, the final EIS has been updated to more completely describe the environmental setting and assess potential impacts.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

Poppe, L.J., Ackerman, S.D., Doran, E.F., Beaver, A.L., Crocker, J.M. and Schattgen, P.T. 2006. Interpolation of Reconnaissance Multibeam Bathymetry from North-Central Long Island Sound. U.S. Geological Survey Open File Report 2005-1145.

Reid, R.N. 1979. Long-term fluctuations in the Mud-bottom Macrofauna of Long Island Sound, 1972-1978. M.S. Thesis, Boston University, Boston, MA. 36 p.

SAIC 1995. Sediment capping of subaqueous dredged material disposal mounds: An overview of the New England experience 1979-1993. DAMOS Contribution No. 95. US Army Corps of Engineers, New England Division, Waltham, MA.

SAIC 2002. Central Long Island Sound Disposal Site Synthesis Report 1999-2000. DAMOS Contribution 139. US Army Corps of Engineers, New England District, Concord, MA.

Stone, J.R., Schafer, J.P., London, E.H., DiGiacomo-Cohen, M.L., Lewis, R.S., Thompson, W.B. 2005. Quaternary Geologic Map of Connecticut and Long Island Sound Basin. U.S. Geological Survey Scientific Investigations Map 2784.

Zajac, R.N., Lewis, R.S., Poppe, L.J., Twichell, D.C., Vozarik, J., and DiGiacomo-Cohen, M.L. 2000. Relationships among sea-floor structure and benthic communities in Long Island Sound at regional and benthoscape scales. Journal of Coastal Research, 16(3), 627-640.

Zajac, R.N. 1998. A review of research on benthic communities conducted in Long Island Sound and an assessment of structure and dynamics. In: L.J. Poppe and C. Polloni (eds.) Long Island Sound Environmental Studies, U.S. Geological Survey, Open-File Report 98-502.

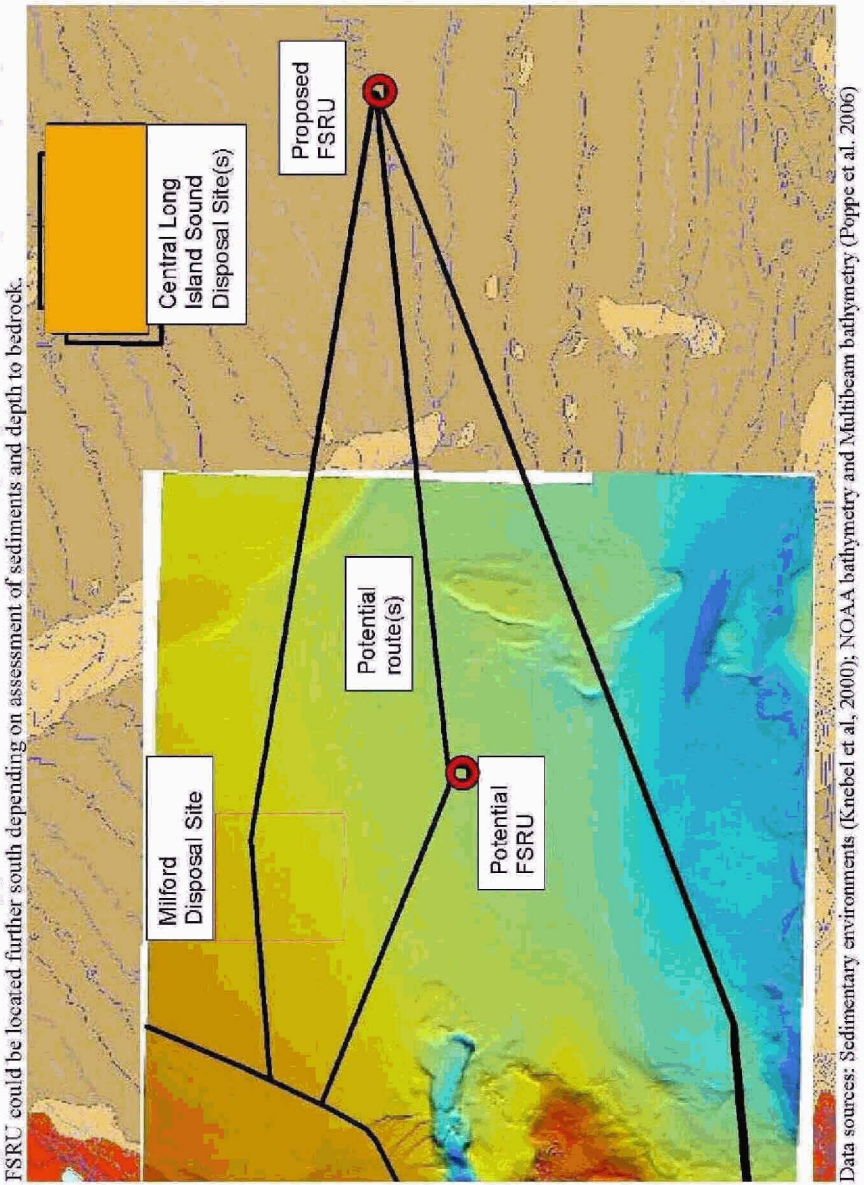


Figure 2. Potential alternative pipeline routes and site location for FSRU superimposed on USGS interpolated bathymetry. FSRU could be located further south depending on assessment of sediments and depth to bedrock.

Data sources: Sedimentary environments (Knebel et al, 2000); NOAA bathymetry and Multibeam bathymetry (Poppe et al. 2006)

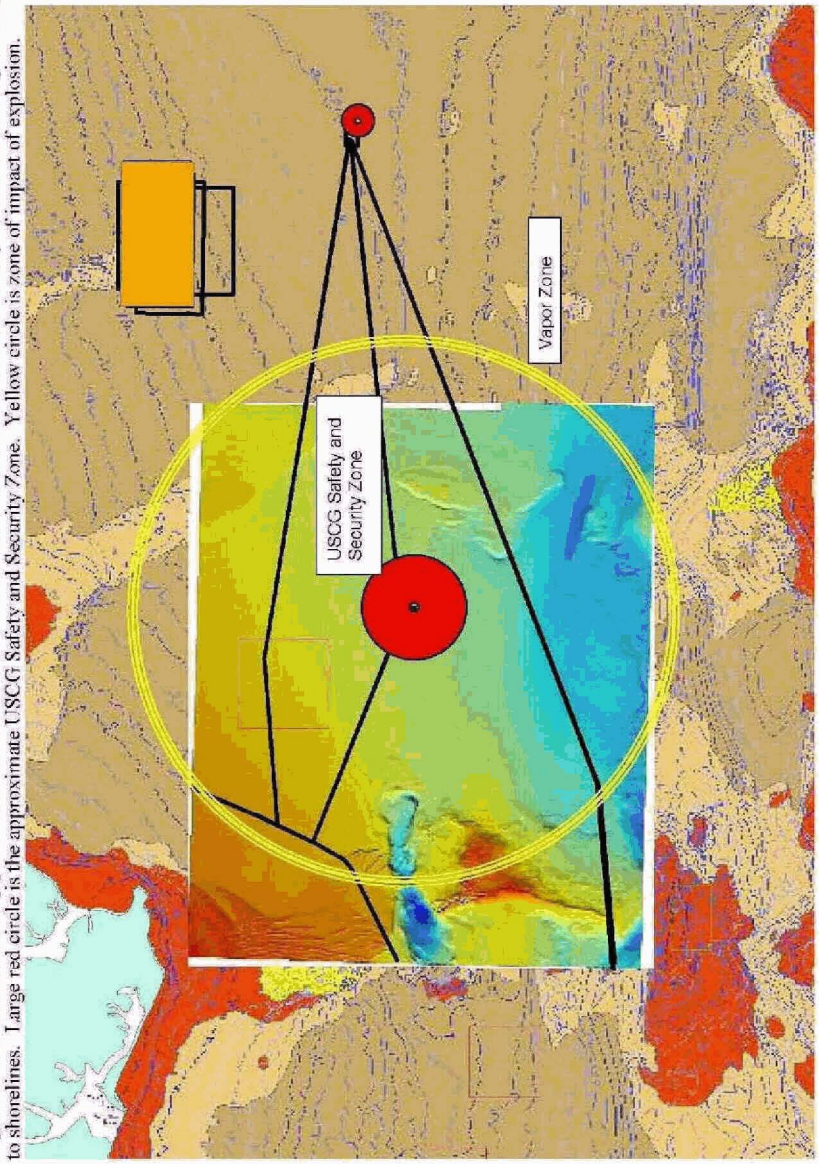


Figure 3. Potential alternative pipeline routes and site location for FSRU. Broader context of sedimentary environments and proximity to shorelines. Large red circle is the approximate USCG Safety and Security Zone. Yellow circle is zone of impact of explosion.

200701235058 Received FERC OSEC 01/23/2007 03:59:00 PM Docket# CP06-54-000, ET AL.

Data sources for Figures 2 and 3:

Sedimentary Environments: Knebel et al 2000
Brown = fine-grained sediment deposition
Tan = sediment sorting and reworking
Yellow = coarse-grained bedload transport
Red = erosion or nondeposition

NOAA 5 m bathymetry contour lines
Poppe et al. 2006

Interpolated Multibeam bathymetry
Poppe et al. 2006
Depths increase from red = shallow through orange, yellow, green to blue = deep. Topography has been enhanced with "sun-illumination" to highlight textural properties and small-scale bottom elevation changes.

Drew A. Carey, Ph.D
Principal Scientist
CoastalVision
215 Eustis Avenue
Newport, RI 02840
401 849-9236
coastal.vision@verizon.net