

# MEMORANDUM

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FOR: Citizens Campaign For The Environment

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SUBJECT: Comments on the Broadwater LNG Project Draft Environmental Impact Statement

The overall conclusion reached in the Draft Environmental Impact Statement (DEIS) for the Broadwater LNG Project proposed for Long Island Sound (November 2006 document) is that minimal impacts would result from the construction and operation of the LNG terminal; however, several assumptions upon which these conclusions are based appear to reflect misinterpretations of the scientific literature. In some cases, quantitative data cited in support of conclusions are not provided in the report or attached references. In other cases, potential impacts are summarily dismissed with very little discussion. I will address two areas specifically in my comments: the potential effects of the proposed LNG terminal on marine life of Long Island Sound and the potential effects of the onshore support facilities proposed for Greenport and/or Port Jefferson, New York.

The discussion of the potential impacts of the LNG pipeline on marine life focuses on American lobsters, *Homarus americanus*, and commercially and recreationally important finfish species, but omits some important scientific evidence which is integral to the discussion of these potential impacts. The DEIS states, without providing any references, that juvenile or epibenthic phase lobsters are located in shallow water less than 30 feet deep (pg. 3-45) and thus pipeline installation would have little if any effect on lobsters during these stages of their lives. However, Sclafani (2001) stated that, when planning surveys of distribution of juvenile lobsters in western Long Island Sound, more juvenile lobsters were expected to occur in deeper than shallower waters. The DEIS states (pg. 3-45) that "Installing the pipeline during winter would avoid impacts to a portion of the adult lobster population because they would have migrated offshore." It is well known that lobsters in Long Island Sound are essentially non-migratory (see review in Howell et al., 2005), and thus confining pipeline installation to winter months would not be expected to reduce mortality of adult lobsters because they would not have migrated out of the area. The potential impacts of crossing Stratford Shoal with a 54 ft wide, 4000 ft long trench are dismissed as "negligible" (pg. 3-46 DEIS) due to the timing of planned excavation activities associated with pipeline installation, but again, this is based on the incorrect notion that lobsters will have migrated out of the area. The recent mass mortality of lobsters in Long Island Sound and the poor condition of the remaining stock are well documented; further damage to this important resource can only exacerbate the problem.

In discussion of backfilling of the proposed pipeline trench with rock (pg. 3-44 DEIS), the suggestion is made that this would provide habitat for potential attachment of oysters and mussels. This is an incorrect assumption: oysters (*Crassostrea virginica*) and mussels (*Mytilus edulis*) found in Long Island Sound are known to occur from the intertidal zone to a depth of 10 meters (Abbott and Dance, 1986) which is much shallower than the depth of the proposed trench (~95 ft = 29 meters). One potential impact of backfilling the proposed trench with rock, which is not mentioned in the DEIS, is

that it may provide better substrate for attachment of larvae of the colonial tunicate *Didemnum*, which has had major impacts on sea scallops and other benthic fauna on George's Bank, and which has been newly reported in eastern Long Island Sound (National Undersea Research Center, 2006). Providing additional hard-bottom substrate in the form of rock lining the pipeline trench might contribute to the spread of this invasive species in Long Island Sound.

Another significant omission in the Draft EIS is the data from the quantitative benthic surveys done by the Broadwater team, which are briefly described on pg. 3-39. Methods and specific results are not provided, and no references are provided either. A general listing is made of benthic invertebrates encountered during video surveys, but without knowing the particular species and the numbers encountered there is no way to judge the potential impacts of the proposed dredging. The invertebrate species mentioned, e.g. amphipods, shrimp, crabs, are very important prey items for the commercially and recreationally important finfish species found in Long Island Sound.

There are several incorrect assumptions and misinterpretations which plague the discussions of potential impacts to marine life from the intake of seawater for normal operations of the FSRU and LNG carrier operations. The intake is proposed from a depth of 40 ft below the water line (pg. 2-8 DEIS). The statement is made that "... phytoplankton and zooplankton communities generally are confined to the top (0-16 ft) of the water column in Long Island Sound during summer and late fall" and the implicit assumption is that since the intake is well below this depth range that impacts to plankton will be greatly reduced. First of all, while some stratification of waters in Long Island Sound does occur during summer months, Conover (1956) showed that the vertical distribution of phytoplankton was fairly uniform from surface to bottom in Long Island Sound. Peterson (1985) studied the vertical distribution of different life stages of the abundant copepod *Temora longicornis* in Long Island Sound and found that while eggs were most abundant in the top 5 m of the water column, each successive life stage (i.e. larvae, juveniles and adults) was found deeper in the water column; adults lived at or near the sediment surface. The latter author is cited as the source for the statement noted above, from pg. 2-8 of the DEIS, so it appears that this information was misconstrued.

Estimated impacts of impingement/entrainment of plankton, including fish larvae, by the Broadwater operation are probably grossly underestimated. Results of the Poletti Ichthyoplankton Program (PBS & J/LMS 2003) and the Broadwater study of plankton are summarized in the Draft EIS, and are used as the basis for calculation of the numbers of larval fish expected to be impinged/entrained by the Broadwater operation. A mesh size of ~0.333 mm (=333 $\mu$ m) is commonly used for such sampling, however, Houde and Lovdal (1984) indicated that only about 10% of fish larvae may be retained by 0.333-mm mesh in inshore areas of Biscayne Bay, Florida. It is stated on pg. 3-58 of the DEIS that seawater intake for the Broadwater LNG terminal will impinge/entrain millions of fish eggs and larvae, but based on the retention efficiency quoted above their estimated mortality rates for fish larvae may be underestimated by a factor of 10. Calculated estimates provided in the Draft EIS of entrainment/impingement mortality due to the estimated intake of 28.2 mgd of seawater (=10.3 billion gallons per year) for normal operations of FSRU and LNG carrier operations speak only of ichthyoplankton and lobster larvae, but say nothing of the myriad species of phytoplankton and zooplankton, which support the Long Island Sound food web. Deevey (1956) reported maximum densities of net zooplankton from Long Island Sound that were higher than 200,000 individuals per cubic meter. Thus, losses of zooplankton and phytoplankton from entrainment/impingement will easily number in the trillions. The proposal is made in the DEIS to use a fine-mesh screen (<0.2 inches) on intake pipes to lower the rate of impingement/entrainment. If, for argument's sake, a screen of 0.1 inches (=2.54 mm) is used, this will exclude virtually no phytoplankton and only the largest invertebrate larvae (Johnson & Allen, 2005). But this is a moot point because the proposed flow rate

(0.5 ft per second) is well beyond the swimming speeds reported (Johnson & Allen, 2005) for marine zooplankton, including crab and shrimp larvae (0.1 ft/sec), bivalve mollusk larvae (0.01 ft/sec), fish larvae (0.1 ft/sec), and adult copepods (0.005 ft/sec). Thus, the thought that plankton will somehow avoid impingement and/or entrainment in the intake water of the Broadwater facility is nonsense. In a discussion of the Port Pelican Liquid Natural Gas (LNG) processing facility proposed for coastal Louisiana, Thompson (2004) concluded that use of a fine-mesh screen intake (<0.2 inches) and intake flow rate of 0.5 ft/sec (the same as proposed for the Broadwater project) "...would allow most larger organisms to avoid impingement at the intake structures, but water passing through the facility will undergo mechanical, pressure, temperature, and chemical (NaOCl [= chlorine bleach]) shock. Some entrained eggs and larvae may survive any one of these adverse conditions (Cada et al. 1981, Muessig et al. 1988), but the combination of these stresses will be lethal to almost all organisms passing through the facility." She further stated that "[u]ntil shown otherwise, we must assume that all fish and invertebrates will die after entrainment and simultaneous exposure to these four environment stress factors." Thompson (2004) concluded by stating that the Port Pelican Liquid Natural Gas (LNG) processing facility would effectively "sterilize" the entire water column (83 ft. depth) of a large area around the facility.

Phytoplankton and zooplankton entrained in the Broadwater intake would not only be lost to the future recruitment of their respective populations, but they would also be lost to the food web which supports the valuable finfish and shellfish populations of the Sound. These losses of plankton will be exacerbated by the daily discharge of sodium hypochlorite (i.e. chlorine bleach) and wastewater described for normal operations of the Broadwater facility (pg. 3-59 Draft EIS). Lighting of the external areas of the FSRU, which would be visible to a distance of 0.6 miles (pg. 3-59 Draft EIS), would potentially attract marine organisms from an area of ~1.13 square miles; light is known as a powerful cue for the depth regulation of larvae of several species of bivalve mollusks and other marine invertebrates (Levinton, 2001) and thus the process of larval attraction by Broadwater lights might further amplify losses due to e impingement/entrainment in intake water at the FSRU. It should be emphasized that impacts due to entrainment/impingement of plankton will occur on a continual basis while the Broadwater project is in operation.

Potential impacts of onshore support facilities to the villages of Greenport and Port Jefferson are effectively dismissed in the DEIS. But the fact is that, using Greenport as the example, the proposed 15.1 acre operations site would occupy most of the Greenport waterfront. The existing waterfront here includes Mitchell Park, with its carousel and ice skating rink; docks for transient vessels, commercial fishing boats, and the Shelter Island ferries; as well as numerous restaurants and shops. The proposed site plan calls for "...a warehouse for storage and handling of spare parts, tools, and equipment; dock space for berthing four tugs, a workshop for tug maintenance; and a waterfront staging area capable of supporting container transfer cranes, large trucks, and a personnel transfer and boarding area." Large containers would also be stored here. The facility would all be surrounded by a perimeter security fence, which can be estimated to be 3100 ft. (~0.6 miles). The statement that "...use of these onshore facilities as proposed by Broadwater, would not result in land use conversion or impacts" (pg. 3-90 DEIS) is patently absurd. Additional details of the impacts of the activities associated with the land-based facility can be surmised from the mention of "container transfer cranes". This implies that the 4 tugs will be bringing in large containers to the land-based facility, to be carted away by "large trucks". Large containers brought in by water necessitate barges. The movement of tugs with barges in tow through the narrow entrance to Orient Harbor and into Greenport Harbor raises serious concerns about potential navigational hazards to the heavy recreational boat traffic in this area.

In summary, the potential impacts of the Broadwater LNG facilities proposed for Long Island Sound and the communities of Greenport and Port Jefferson, NY are grossly understated and, as such, do not accurately portray the environmental and social costs of the project.

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