

New York State Department of Environmental Conservation



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December 21, 2007

Murray Sondergard
Broadwater Energy LLC
c/o Robert Alessi
LeBoeuf, Lamb, Greene & MacRae LLP
99 Washington Avenue, Suite 2020
Albany, NY 12210-2810

Re: Broadwater Energy Project
DEC No. 1-4799-0007/00001
NOTICE OF INCOMPLETE APPLICATION

Dear Mr. Sondergard:

The New York State Department of Environmental Conservation (the Department; DEC) has reviewed the permit applications and supporting documentation submitted on behalf of the Broadwater Energy Project. Applications examined include those for air, State Pollution Discharge Elimination System (SPDES), petroleum bulk storage, and hazardous substance bulk storage permits; and a Section 401 Water Quality Certificate. Comments on these applications are provided below.

Project Description

The Broadwater Energy Project is a joint venture between TransCanada and Shell US Gas and Power, and involves construction and operation of a marine liquified natural gas (LNG) terminal and underwater natural gas pipeline, both in Long Island Sound. The terminal and pipeline will be used to import, store, regasify and transport natural gas. The terminal will hold roughly eight billion cubic feet (bcf) of LNG with vaporization capabilities of 1 bcf per day and up to 1.25 bcf at peak.

The terminal will be a Floating Storage Regasification Unit (FSRU), the first such free-floating FSRU in the world. The terminal will be located in roughly 90 feet of water, approx. nine miles north of the Long Island coast and approx. 12 miles south of the shoreline of Connecticut. A 30-inch diameter pipe will be installed for 21.7 miles on the bottom of Long Island Sound, from the FSRU west to an underwater connection with an existing Iroquois Gas Terminal System pipeline.

The FSRU will be approx. 1,215 feet long, 200 feet wide and 100 feet high, with a 40-foot draft. The FSRU will be moored to a tower anchored to the bed of Long Island Sound. The mooring system will allow the FSRU to weathervane around the tower, and the tower base will be approximately 13,180 square feet on the Sound bottom.

Federal Jurisdiction

The Federal Energy Commission (FERC) must approve the pipeline and LNG handling, storage, and regasification on the FSRU. The US Coast Guard is responsible for the safety and security of the FSRU, and LNG carriers at berth and in transit. The US Army Corps of Engineers must approve the project under the Rivers and Harbors Act and the Clean Water Act. This requirement is also subject to federal regulations, known collectively as the General Conformity Rule. Pursuant to Section 176c of the Clean Air Act, FERC must find the project in conformity with New York's State Implementation Plan. Under the National Environmental Policy Act LNG import facilities are Major Federal Actions, requiring an environmental impact statement (EIS). A Draft EIS was completed by FERC in November 2006.

Department of Environmental Conservation Jurisdiction

The project must be approved by DEC under Federally-delegated regulatory programs. Thus the project requires an air and SPDES permit, and a Section 401 Water Quality Certificate (WQC) from DEC. In addition, the Department must issue the project a Hazardous Substances Bulk Storage permit and a Petroleum Bulk Storage permit for the use and storage of hazardous substances and petroleum based substances, respectively. The Department will review the project's General Conformity Applicability Analysis.

Applications have been received for all permits, and, with the exception of the SPDES permit application (received December 12 and under active review), are addressed by the comments below. Broadwater's General Conformity Applicability Analysis, received December 6, is also under review and DEC's comments on it, if any, are forthcoming.

The Department has reviewed these applications for consistency with the applicable statutes, implementing regulations, and Department policies and practices developed thereunder. If our analysis reveals insufficient information has been provided we will determine the applications incomplete, and, under our procedural regulations, all the applications must be complete simultaneously in order for the application procedure to move to the next stage of public review and decision-making.

Ultimately, if our review concludes the applications are in non-compliance with the applicable statutes and regulations we will be unable to approve permits for the

project. DEC will disapprove any activity with the potential for a significant adverse environmental impact that is unmitigated or not offset by demonstrated social benefit or public need.

Review Summary

DEC's review of the air application concentrated on the air impact analysis, and considered issues relative to the impact assessments. We find that the application lacks details on applicable DEC and EPA requirements, requirements we had previously told Broadwater to address. It contains a project overview and fragmented sections on aspects of the permit requirements and only a summary table of non-applicable requirements.

Review of the air quality impact analysis has identified a number of significant issues which must be addressed before conclusions can be reached on projected impacts, and before we can determine the application to be complete. Projected exceedences of the SO₂ PSD increments and PM_{2.5} standard indicate that an air permit could not be granted at this time. Because this review is iterative, the Department will await your response to the items listed below before conducting a full review of modeling results.

Regarding the seabed pipeline, the project proposes to leave the pipeline trench open, allowing it to backfill passively over time. The Department believes that cable and pipeline trenches do not fill in naturally in all locations, as field evidence increasingly indicates, and that these open trenches present unnecessary negative impacts to aquatic biota. Accordingly, the Department objects to the open trench proposal and reiterates its position that the trench should be backfilled after pipeline installation to restore pre-construction bottom topography, and eliminate negative impacts. Before the Department can determine whether to issue a WQC it will be necessary for Broadwater to more thoroughly explore and evaluate the facts and science associated with trenching alternatives including backfilling techniques.

Last, the project as proposed presents significant adverse impacts to the Long Island Sound aquatic environment and fishery through the entrainment and impingement impacts of the FSRU and LNG carriers. There are design changes suggested below to reduce this impact, but even with these changes the project's effect on the fishery will be significant. Further assessment and consideration must be given to additional changes and mitigation measures relative to this impact.

Review Comments

1. Application Form

- a. The applications fail to properly identify the permit applicant. The applicant is identified as Broadwater Energy LLC, and the person signing the application is

titled Project Director. No address is given for the company, nor is the Project Director identified as a company employee, representative or agent. At minimum, an address for the company must be provided and a duly designated officer or principal of the company must sign the applications.

b. The application lists Broadwater Energy LLC as the owner. The underwater land on which the project will be undertaken (the bed of Long Island Sound) is owned by the State of New York. The Department requires that the owner identified in the application hold title to the land, facility, easement or right-of-way on which the project will be undertaken. If someone other than the owner is the applicant, written consent of the owner to use the property or facility must accompany the application. Broadwater must demonstrate that the NYS Office of General Services will provide it with the appropriate leasehold to site the facility as proposed.

2. Air Application

a. Section 1 of the Air Quality Modeling Report (Attachment 3d of the application) states that, per NYSDEC guidance, the emissions from the docked LNG carriers are included in the impact analysis. Section 3.1 notes that only the boiler emissions associated with LNG pumping were included as required for EPA's PSD applicability determination. However, DEC consistently noted in its comments during the protocol review that all "stationary" source emissions must be included in the impact analysis, in addition to those on the FSRU, independent of any applicability determinations. Thus, emissions during ship hoteling noted on page 3-7 and any other emissions from the carriers or any anticipated tugs while stationary next to the FSRU must be modeled.

Page 3-7 also notes that, per NYSDEC guidance, the short term emissions have not been scaled for the hours with zero emissions in a 24 -hour period. This change should also be reflected in footnote 1 of Table 4 in Attachment B (Emissions Workbook) of the modeling section, and in other locations.

b. Section 3.3 notes two sizes for carriers that will supply LNG to the FSRU: 140,000 and 250,000 m³ vessels. For the smaller carriers, the oil sulfur content is 4.5% maximum and 2.7% average for the short term and annual impacts, respectively, based on data reported by an international convention. For the larger 250,000 m³ carriers, the modeling is based on 1.5% sulfur content which it said to be the anticipated convention limit. Broadwater must provide an acceptable demonstration process, and permitting should reflect the means by which both these limits will be achieved by the carriers that will supply the FSRU. Otherwise, the maximum available sulfur content fuel should be used in the modeling analysis.

In addition, Attachment 3c of the application notes that the PM10 and PM2.5 emissions for the FSRU components reflect the factors from AP42, which includes the condensible fraction of particulates. It is not clear if condensible particulate form is also reflected in the carrier emissions per noted Reference 13. If not, these should be included in the modeling results.

c) Section 3.4 discusses how building downwash considerations are addressed in the modeling and references Appendix B for the FSRU and carrier dimensions. The only diagrams we can find are in Appendix E, but these do not provide plot plans detailed enough to confirm whether the BPIP-PRIME input dimensions are proper. Thus, more detailed vertical and horizontal plot plans should be provided.

d) The impacts of short term emissions due to startup and shutdown conditions are incorporated in the modeling by scaling the hourly emission rates. In previous comments to Broadwater on the protocol DEC requested a separate assessment of the short term impacts of pollutants affected by these conditions. The request was based on the potential lower stack temperatures and velocities associated with start up and shut down periods. Although the modeled hourly emission rates used by Broadwater have accounted for these conditions, the corresponding effects of lower stack parameters must also be addressed.

e) Pages 2-3 of Section 2 incorrectly note that our August 31, 2007 comments on the modeling protocol stated we were satisfied that the safety zone can be used as the fence line for the purposes of defining ambient receptors. Our review letter only noted that we did not need further information from Broadwater at the time because we were awaiting EPA's decision on where ambient receptors should be placed. That determination was made by EPA in an October 9, 2007 letter. Thus, section 2 and Section 3.6 discussions on receptor placement should reflect EPA's determination that the safety zone can be the starting distance of the receptors, including the determination that the carriers are considered to be under the control of Broadwater and can be excluded from the definition of ambient air.

f) Section 4 of Attachment 3d presents the results of the modeling of the FSRU with and without the carriers at berth (at two sizes noted above) using the OCD and AERMOD models approved for use as per the modeling protocol review for specific conditions. The results are presented in Tables 8 to 10 for the OCD model and are separated by on-water and on-shore receptors, while Tables 11-13 present results of AERMOD that simulated downwash effects using more recent methodologies than in OCD on near-field receptors(i.e. over water only). To the extent that these results will be affected by comments 1 and 2 above, a revised set of Tables will need to be provided. These tables should also be revised to include PM10 annual impacts since the PM10 standards and PSD increments are still applicable in New York for source permitting purposes.

The results presented indicate that for each of the pollutants modeled, there is at least one scenario under which the corresponding EPA significant impact levels (SILs) are exceeded. We request that the distance to which the SILs are exceeded (i.e. the Significant Impact areas, SIAs) be provided in all these instances, as well as the locations at which the maxima occur for each of the tabulated results. EPA and DEC policy requires that when a SIL is exceeded, a cumulative impact analysis be conducted to assure that the proposed facility does not contribute to a modeled standards violation. The modeling protocol (Appendix A, page 3-19) notes that under these circumstances, NYSDEC procedures in DAR-10 and Air Guide 36 are used to assess whether and which nearby sources need to be explicitly modeled in a cumulative analysis, in addition to the use of regional background levels to represent other source contributions.

On the other hand, the application improperly argues that nearby sources need to be modeled primarily if the proposed source is on land and if its SIAs overlap "permanent" receptors (i.e. not over water). Significantly, this argument is only presented for the AERMOD results wherein receptors have been confined to the near field (over water locations) and this limitation translates to there being no nearby major sources within the 15km distance to the shoreline at Long Island. Thus, the results from the project are added to only the regional background levels for comparison to standards in Tables 11-13.

Not only are the supporting arguments provided in the application unjustified, but also it should be noted that the OCD results in Tables 8 to 10 indicate that the short term SILs for SO₂ are exceeded at the shoreline receptors, in addition to numerous exceedences at over water receptors. Thus, a cumulative analysis is necessary for the project to demonstrate that it does not contribute to standards violations. That analysis must follow the procedures in NYSDEC DAR-10 and Air Guide 36 as well as in EPA's New Source Review Workshop Manual. Since the protocol did not detail how such an analysis might be performed, Broadwater should submit a proposal for DEC review and approval before undertaking the analysis.

The starting point would be to define the SIAs for each pollutant and request a source inventory from New York and/or Connecticut (once it identifies on which shoreline the SILs are exceeded) out to 50km from the largest SIA. Furthermore, the cumulative analysis should remedy the limited receptors placement in the application to only along the shorelines (page 3-19), while the protocol noted that a grid of receptors would be placed to capture near and on-shore impacts. That grid should be refined to assure maximum impacts are defined for the cumulative analysis.

g) The AERMOD results in Table 12 indicate that the project is predicted to exceed the 3 and 24 hour SO₂ PSD increments with the 140,000 m³ LNG carriers at berth. Whether other pollutants or scenarios also might be projected to have similar exceedences will depend on responses to comments above on carrier emissions. We had indicated in our 8/31/07 protocol review letter that the PSD regulations require an increment consumption analysis for minor sources, even if these are not PSD applicable, pursuant to 40 CFR 51.166(b)(13)(ii)(b). These exceedences mean that the project as proposed cannot be permitted without mitigation of the increment violations. The resolution can include either a project modification or impact offsets per guidance in EPA's New Source Review Manual (Section C.IV.E).

h) The application discusses the impacts of the project on PM_{2.5} levels in the context of Commissioner's policy Commissioner=s Policy 33 (CP-33. *Assessing and Mitigating Impacts of Fine Particulate Matter Emissions*. 12/29/2003) on pages 4-8 to 4-10. It concludes that even though these impacts are above the thresholds in CP-33 that would require an environmental impact statement, such a Draft EIS has been submitted to FERC. We previously commented on this analysis and do not know yet FERC=s conclusions in the Final EIS. However, it is seen from Tables 11 to 13 that the impacts from AERMOD predictions are above the 24 hour PM_{2.5} standard of 35 ug/m³ with and without the carriers next to the FSRU, when the maximum regional background level from the protocol is added to the project impacts. If this background level is used for the OCD model results in Tables 8 to 10, the same standards violations would result. As noted previously, these results do not account for comments 1 and 2 above which could increase the level of impacts.

These projected violations are unacceptable for inclusion in the FERC EIS, and for DEC permitting purposes. Broadwater can revisit the background levels, which they note to be conservative, using procedures allowed in EPA's Modeling Guidelines. In addition, the application (and FEIS) should discuss all measures which Broadwater can take to minimize the impacts of PM_{2.5} not only to meet CP-33 requirements, but also because the location of the project can be deemed to be in the PM_{2.5} nonattainment area.

i) Section 3g of the application discusses the nonattainment requirements of Subpart 231 with respect to an alternative site and size analysis using the "three prong" test previously determined by the Commissioner as a necessary component for major source review in nonattainment areas. Aspects of this alternatives analysis need to be revised or augmented. With respect to the first prong addressed in Section 3.1, the discussions fail to address the projected PM_{2.5} standards violations (and increment exceedences) noted above in demonstrating that the potential adverse effects have been avoided to the maximum extent possible.

With respect to the third prong, the application discussions rely on their alternative sites analysis in the FERC DEIS and claim FERC has accepted these assessments. However, the requirements of Section 231-2.4(a)(2)(ii) are independent of what information FERC might accept or require to reach its determinations. Thus, the application's claim that they need only look at sites they own or control is inappropriate within the context of Subpart 231, and is especially since they do not own or control the underwater lands of the proposed site. Furthermore, most of the discussions appear to summarily dismiss all Atlantic Ocean sites and address either onshore or Sound sites, while ocean sites are noted in terms of sites in New England or Gulf of Mexico. The only site on the Atlantic side of Long Island mentioned is the Safe Harbor project which is noted to be in initial stages of proposal without any discussion of relevant environmental impacts. There is also a brief discussion of the pipeline sites suggested by NYSDOS for consideration, as presented in Section 5 of the application.

These discussions of alternative sites fall short of the requirements of Subpart 231-2 for the Broadwater proposal. Sites which are distinctly different from the proposal should be assessed in detail with respect to the air quality aspects, and whether they offer more environmental benefit without unduly curtailing the project benefits.

3. General Conformity

As stated above, Broadwater's General Conformity Applicability Analysis was received by the Department on December 6. It is under review and DEC's comments on it, if any, will be provided as soon as possible, but no later than February 8, 2008.

4. Section 401 Water Quality Certificate

a. The application proposes to leave the pipeline trench open, allowing it to backfill naturally over time. DEC believes there is strong evidence that portions of exposed trenches remain open years after construction, and that an open trench may have a negative impact on the movement and survival of lobsters and other aquatic organisms. Backfilling with native substrate to restore the pre-construction topography will allow for more rapid re-colonization by benthic organisms. In addition, backfilling will minimize the potential for thermal impacts on NY's already stressed lobster resources.

Temperature increases in the vicinity of the pipeline can exceed 20 degrees F above ambient temperatures. Such an increase would be detrimental or fatal to lobsters during summer months when ambient temperatures in Long Island Sound approach the maximum tolerated by lobsters.

Accordingly, to avoid these impacts the Department strongly supports the FERC proposal in its Draft EIS to actively backfill the trench and strongly recommends that the project be redesigned to backfill the trench immediately after pipeline installation, in order to restore pre-construction bottom topography, and is unlikely to authorize a pipeline construction that does otherwise. Any WQC issued for the pipeline would require post-construction monitoring to ensure that the natural topography is restored and maintained.

b. Although the application provides no construction schedule for the pipeline, if the project is approved the Department will likely impose seasonal construction restrictions to protect aquatic resources.

5. SPDES Permit Application

a. As state above, a revised SPDES application was received by the Department December 12 and review is ongoing. The Department will provide comments on the application, if any, as soon as possible, but no later than February 8, 2008.

6. Seawater Withdrawal

According to application documents, the project (the FSRU and LNG carriers) will withdraw a total of approx. 28.2 million gallons per day (MGD) of seawater. This will result in an estimated 274 million eggs and larvae being entrained annually, and, in addition, an unknown number of young-of-the-year (YOY) and small adult fish.

Of that total, the FSRU will withdrawal 6.6 MGD to support all FSRU operations. This will result in the annual entrainment and death of 64 million eggs and larvae and, again, an unknown number of YOY and small adult fish. The estimated 130 carriers per year will potentially entrain 210 million eggs and larvae (approx. 1.6 million per vessel), and an additional unknown number of YOY and small adult fish.

The Department believes that the destruction of over 270 million eggs and larvae, and more YOY and young adult fish, annually, is a significant adverse impact to the aquatic environment and fishery of the Long Island Sound.

Relative to the FSRU, the current design of the intake screening in the sea chests calls for cleaning the sea chests periodically, not continuously. As a consequence, most (likely all) impinged organisms will die. In addition, current designs call for adding chlorine before the screen. This will ensure that any organisms that may survive the physical stress of being impinged on the screen will be killed by being exposed to the chlorine.

Therefore, the Department strongly recommends that the intake structure use a wedgewire screen with a mesh size of 2mm or less, equipped with a "air burst" cleaning system. This will significantly reduce impingement and entrainment mortality from the FSRU=s intake. It is also strongly recommended that the intake be redesigned to prevent fish mortality from exposure to chlorine.

Even with these design changes, however, the project will result in the death of approx. 210 million eggs and larvae and an unknown number of YOY and small adult fish, through entrainment in the LNG carriers= intake systems. The Department believes this is a significant adverse impact to the LIS aquatic environment and fishery, caused as a direct result of the project=s operations. The application documents must fully assess the impact and propose alternatives which seek to eliminate, minimize or mitigate this significant adverse environmental impact.

7. Hazardous Substance Bulk Storage Registration Application

- a. The application is overly generic and provides little information on specific design of the three chemical bulk storage tanks ranging in size from 4,000 to 19,800 gallons. The relative location of the tanks are depicted on a general vessel plan, but the plan does not include the location of piping. Further, the FSRU is proposed to have three SCR skids. These will be required to have some form of containment as well. Review of the application revealed that many sections were not addressed, such as leak detection, high level alarms, gauges, etc.
- b. Two of the three chemical bulk storage tanks will require internal inspections approved by a licensed Professional Engineer every five years (the 19,800 gallon ammonia tank and 13,200 gallon mercaptan tank).
- c. The application included a generic SPCC plan. However, pursuant to 6NYCRR Part 598.1(k), a site specific Spill Prevention Report (SPR) will have to be provided prior to commencement of operations.

7. Petroleum Bulk Storage Registration Application

- a. There will be nine tanks ranging in size from 2,100 gallons to 310,000 gallons for a total storage capacity of 645,182 gallons. Because the total storage capacity exceeds 400,000 gallons the facility is considered a Major Oil Storage Facility (MOSF). Broadwater must complete a MOSF application (available on-line at the Department=s website) and must provide the actual date of installation or construction.
- b. Because the vessel has not been built yet, the Spill Prevention, Containment and Countermeasure (SPCC) Plan submitted with the application is generic and

many sections are blank. However, the application acknowledges that a site-specific SPCC must be developed prior to commencement of operations. DEC would prefer to review the SPCC prior to operations to ensure compliance.

c. The FSRU will have a double bottom. However, the application must provide more specificity on construction of the tanks. The PBS application has many sections which were not properly coded, including leak detection and spill prevention (i.e. high level alarms, etc.).

d. Figure 2-2, FSRU Hull Cross-section, indicates the 310,000 gallon diesel tanks will share a bulkhead with the water ballast tanks. Although the application describes the FSRU as having a double floor, it is unclear how a diesel leak into the water ballast tank would be detected. The application must identify the leak detection methodology to be employed.

As stated above and indicated in these comments the Department finds the applications to be incomplete at this time. In addition, please be aware that the Department will only issue a notice of complete application when all applications are complete. To continue the application review procedure Broadwater must respond to these comments.

In addition, the Department's reviews of the SPDES application and Broadwater's General Conformity Applicability Analysis are ongoing and comments on these applications will be forthcoming. Finally, please be aware that, consistent with 6NYCRR § 621.14(b), at any time during the application review the Department may request additional information as necessary to make the mandated decisions, findings or determinations.

If you wish to discuss the comments or have any other questions please contact me at the above telephone.

Very truly yours,

John J. Ferguson
Project Review Coordinator

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