20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

DEWEY & LEBOEUF

April 8, 2008

BY ELECTRONIC FILING

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

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

Dear Ms. Bose:

Enclosed for filing in the referenced proceedings is a copy of the April 8, 2008 correspondence of Broadwater Energy LLC and Broadwater Pipeline LLC (collectively, "Broadwater") with the New York State Department of Environmental Conservation regarding Broadwater's State Pollutant Discharge Elimination System application.

Please do not hesitate to contact me with any questions regarding this submission.

Respectfully submitted,

/s/ Brett A. Snyder

Brett A. Snyder

Enclosures

cc: Mr. James Martin, FERC

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BROADWATER

Broadwater LNG Project
Docket Nos. CP06-54-000 and CP06-55-000
Federal Energy Regulatory Commission

April 8, 2008

VIA HAND DELIVERY

Mr. John Ferguson
New York State Department of Environmental Conservation
Division of Environmental Permits
4th Floor
625 Broadway
Albany, NY 12233-1750

RE: Response to Notice of Incomplete Application, February 8, 2008
DEC No. 1-4799-0007/00001

Dear Mr. Ferguson:

By this letter, Broadwater is providing additional information to address areas identified in the above-referenced Notice of Incomplete Application (NOIA) regarding seawater withdrawal for the Broadwater Facility and the State Pollutant Discharge Elimination System (SPDES) Application submitted to New York State Department of Environmental Conservation (NYSDEC) on December 12, 2007.

For your review, we have included the specific measures Broadwater would adopt and implement at our facility in Long Island Sound to substantively and successfully address NYSDEC concerns relating to the Section 401 Water Quality Certificate and SPDES Permit. These impact avoidance and mitigation measures are provided to address the specific concerns NYSDEC has expressed, both during the course of meetings and in the NOIA, regarding the potential impacts to ichthyoplankton related to seawater withdrawal, and are intended as substantive avoidance and mitigation measures to further the permitting process.

As you will read, both in the body of this letter, and in the supporting attachments, in our opinion, NYSDEC has misinterpreted and thus mischaracterized the data presented regarding the anticipated ichthyoplankton impacts which we believe, wrongly leads to the conclusion that operation of the FSRU would have "significant adverse impacts" on existing ecosystems in Long Island Sound. Conversely, we believe that the data, in fact, supports our conclusion, as well as the Federal Energy Regulatory Commission's conclusion, that operation of the FSRU **would not be anticipated to have a significant adverse impact** on existing communities within Long Island Sound. Regardless of the characterization of the level of impact that is anticipated to occur, we continue to refine the project design in ways that will further reduce anticipated impact, while still providing for safe and reasonable operability.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Contained in this response is information relating to seawater reduction practices, resulting decreases in ichthyoplankton impacts, and potential monitoring and fisheries sustainability programs that Broadwater would implement with the input of NYSDEC and subsequent approval of facility permits.

The design changes outlined in this response demonstrate the commitment Broadwater has made to install the best technology available to minimize impacts to the Long Island Sound aquatic environment and fishery to the maximum extent possible. We note that measures proposed by Broadwater reflect the bounds of marine technologies that have a proven level of application and performance in a moving marine environment. While we recognize that there may be technologies available that have been used for shore-based facilities and, in theory, could potentially further reduce project impact, we do not believe that these alternate technologies can be successfully implemented within the framework of the Broadwater Project. Broadwater will continue to engage with the NYSDEC on water and air issues and will comply with all applicable regulations in these areas.

Broadwater also reiterates our long-standing request to schedule a meeting with NYSDEC technical staff at the earliest opportunity to discuss the information provided below and any additional questions regarding information presented in Broadwater's permit applications that are currently under review. Broadwater remains committed to providing sufficient substantive/technical information to the NYSDEC to support a completeness determination on the applications and permit issuance, and looks forward to working with NYSDEC permit reviewers to facilitate permit approvals for the project moving forward.

Seawater Withdrawal

Broadwater has demonstrated through the engineering design process of the FSRU, started over three years ago, that we have employed the best technology available to avoid and minimize adverse environmental impacts to the Long Island Sound fishery while still maintaining safe and reliable operations on the FSRU. Safe and reliable operations are dependent upon the implementation of a water intake system that is technologically feasible and has proven marine application in other vessels that are in use today. This proven technology is qualified by its ability to function in a moving marine environment.

Several factors were considered in the determination of the best technology available for FSRU water intake design and include: limited space on the vessel, maintenance needs, avoidance of external structures that protrude from the FSRU that could be damaged, and the selection of equipment that has a history of successful and reliable application on a marine vessel such as the FSRU in a marine environment. All of these factors were considered in the current design of the FSRU and the technology evaluation to minimize adverse environmental impact on the fishery.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Broadwater has identified additional technologically viable design and operational measures that we will implement at the facility as part of the SPDES operating permit conditions to further reduce facility water use both on the FSRU and for the LNG carriers and to further reduce the amount of seawater that is chlorinated and in-turn discharged to Long Island Sound.

These changes, which are discussed in more detail below, will further reduce the impact that operation of the Broadwater Facility will have on the ecosystem and minimize any impacts on the Long Island Sound fishery.

1. Intake Structure

In response to previous comments received from NYSDEC and as part of the Federal Energy Regulatory Commission (FERC) application process, Broadwater has provided numerous filings and supportive information concluding that a 5 mm flat panel screen provides the best level of proven marine application and protection for ichthyoplankton at the Broadwater Facility. Specific comments on the perceived magnitude of impacts to ichthyoplankton are addressed separately in Section 3 of this response.

Also, in response to a request made by NYSDEC at a meeting in January 8, 2008, Broadwater evaluated a range of smaller size external grills. Any grill spacing considered as part of the project design must be commercially available for installation on the vessel and have some level of proven marine application for an offshore vessel such as the FSRU. Results of this technology evaluation indicate that Broadwater can and will commit to a smaller external grill spacing size of 1-inch, which will be designed as vertical bars or a grill arrangement with a 1-inch separation distance between each bar rather than a grate with cross-bars. This vertical grill design will offer a higher level of protection than the initially proposed 4 inch by 2 inch grate and will further minimize any potential impacts to the Long Island Sound fishery from impingement and entrainment and limit exposure of marine life to the seawater treated with sodium hypochlorite.

Broadwater has investigated using flat panel wedge wire screens on the water intakes of the FSRU, but does not believe that this technology can successfully be implemented within the open water marine environment at the proposed FSRU location. Based on the volumetric throughput of seawater and the available flow area of the wedge wire screen per unit area, the intakes would need to be considerably increased in dimension compared to the present arrangements in order to maintain a flow velocity at the intake of <0.5 ft/sec. This undesirable effect can only be partially reduced by increasing the number of sea intakes to cover the total volume throughput of seawater, or by providing dedicated sea chests for utility and ballast seawater requirements thus increasing the size and number of water intakes and subsequently increasing the opportunity for exposure of organisms to the seawater chlorination process. As discussed

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

in Section 2 below, Broadwater will in any case modify the seawater intake structures to reduce potential impacts associated with seawater chlorination.

The adverse impacts of using wedge wire screens from both an operational and environmental standpoint may be summarized as follows:

- The hull structural arrangements required for wedge wire screens would be of increased complexity due to a requirement for larger intake area opening to ensure adequate flow and volume, and would require greater internal structural complexity due to reduced space availability since many other vessel systems are already located in this area of the hull including several pumps and storage tanks.
- Larger intake area openings required for wedge wire screens would subsequently result in more opportunity for exposure of organisms to the seawater chlorination process and increased mortality.
- Since the FSRU will remain on station throughout its service life, the hull structure openings to sea chests have been arranged in such a fashion that they can be blanked off (covered up) as a required safety precaution whenever routine inspection or maintenance is required on the internal side shell valves. Larger openings with wedge wire screens would increase the difficulty of these tasks, which are mandated by the Classification Society / Certifying Entity that would be responsible for review and approval of the maintenance plan that would cover these tasks. The fitting of blanks, to a traditional ships-type sea intake grid arrangement, is a recognized operation where the mitigation risks and control mechanisms have been well established and the risk reduced to a manageable level. Changes due to a completely different size and type of hull opening would increase the complexity of the operation leading to concerns over the safety of the operation, as it has to be understood that without an effective blank on the outside of the ships hull, and with the side valve missing there is nothing stopping ingress or flooding of water into the machinery space of the FSRU. This risk would extend for the life of project operations.
- Internal inspection per Underwater Inspection in Lieu of Drydocking (UWILD) requirements and cleaning of the sea chests and changing out of fittings like anodes would be more difficult due to the complexity of the internal structure, and would result in safety and operations issues that would extend for the life of project operations.
- Increased frequency of diver intervention would be required to clean wedge wire intake screens compared to a traditional ships-type sea intake grid arrangement, and would result in safety and operations issues, e.g. the intake structure would be larger leading to an increased possibility of an

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

incident involving a diver getting caught within the recessed structure. This risk would extend for the life of project operations.

More importantly, Broadwater has also concluded based on additional evaluation that wedgewire screens would not reduce overall impingement/entrainment mortality. This is primarily due to the proposed function of fine-mesh wedgewire screens (1.75 mm) on the sea chest intakes relative to the proposed 0.2 inch (5 mm) mesh screens. An inverse functional relationship exists for the screening technology which shows that any mortality decrease gained from decreasing entrainment is lost by increased impingement of fish eggs and larvae on the smaller mesh screen. Therefore, the result is no overall difference in mortality, but rather a change in the mortality mechanism. With the implementation of a 1.75 mm fine-mesh wedgewire screen, it is expected that entrainment in the FSRU water intakes would decrease; however impingement on the screen would increase. This would result in the same number of ichthyoplankton impacted from the FSRU water intakes, which Broadwater demonstrated in prior submittal information, and FERC concluded in their FEIS, as not being significant. In addition, since Broadwater's design implements a National Marine Fisheries Service (NMFS) recommended low through slot velocity (<0.5 ft/sec), any benefit realized from the presence of sweeping current carrying organisms away that have not been impinged is likely the same for both screens, as anything pulled into the cross-over pipe area of the water intake is expected to be either impinged on the screen or entrained by the water intake.

Finally, and most importantly, from an operational standpoint, wedge wire screens, or screens with a mesh size smaller than 5 mm can't be implemented without adversely impacting, and possibly degrading operational reliability, performance, and safety on the FSRU. An analysis of the vessels currently operating in the Shell fleet indicates the typical mesh size on a marine vessel is 8-10 mm. Broadwater's commitment to 5 mm screens provides a significant reduction over what is typically used on an industry-wide basis. As with ocean going vessels like an LNG carrier, if a smaller mesh or wedgewire screen were implemented on the FSRU, there would be a likely need for a crew member to be permanently stationed at the intake screen locations to assure operability of the system. Frequent changeovers to alternate sea chests would be required to clean debris from smaller sized screen. This unblocking of screens would be a continuous operation of switching from one intake to another to ensure at least one intake screen is operational to support vessel water needs.

The potential for significant blockage restricting water intake volumes has severe ramifications if the vessel is moving, which could lead to an increased risk of break down if the system can't "receive" the necessary volume of water due to a screen blockage. In a worst case scenario, inadequate water intake could result in engine failure with a resultant loss of power for the vessel. Even with the 5 mm screens that Broadwater will implement, there will be a need for a more stringent and frequent regular cleaning operations than would normally be expected.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Based on our analysis we can conclude that the design basis Broadwater has set forth is the best available technology that can be reasonably implemented, and is, in itself, a major modification to the FSRU design. We have concluded that wedge wire screening technology or other screening technology smaller than a 5 mm flat panel mesh screen cannot be feasibly implemented at the facility.

2. Broadwater Facility Seawater Impact Reductions

Operations at the Broadwater Facility include the use of seawater taken in by the FSRU as well as LNG carriers for on-board operations and ballasting. Broadwater has been working in consultation with the NYSDEC on these potential impact issues and has committed to three operational adjustments at the facility that will reduce the volume of water intake and subsequently will reduce the impacts to ichthyoplankton and resulting mortality pending approval from NYSDEC.

The operational adjustments, upon approval from NYSDEC, would be incorporated into the Broadwater Terminal Regulations. All operational procedures that are required by the Broadwater Facility will be established through Broadwater Terminal Regulations, which form part of the overall Operations Manual. The Operational Manual is required under 33 C.F.R. § 127.305 to be submitted to the Captain of the Port ("COTP") Long Island Sound, for review and approval, at least 6 months, but no more than 12 months before the FSRU would receive LNG deliveries. Broadwater plays an active role in the development and review of the Operations Plan, but it will be the USCG that has final authority to accept, or reject, any proposals related to safety, security and navigational matters. Once approved, the Operations Plan, and therefore the Broadwater Terminal Regulations, are binding on Broadwater and non-compliance will subject Broadwater to potential sanctions and other enforcement action. Additional detail regarding the reporting of these commitments in practice is provided in Item 5 below.

The operational adjustments include:

- **LNG Carrier Ballast Water Management Practices.** As part of the Terminal Regulations to be issued by the USCG, Broadwater will request that all vessels limit the ballast quantities loaded at the FSRU, whenever possible, and request that each LNG Carrier take on any additional ballast water required for transoceanic transit after departing the Broadwater Facility. This is different than other commercial traffic utilizing Long Island Sound where there is no restriction on ballast loaded. In all cases, while moored to the FSRU, the LNG carrier would take on the minimum ballast water required for propeller immersion and safe navigation. This practice will minimize the amount of ballast water taken on by the LNG carrier. With these management practices in place, LNG carriers could potentially reduce their ballast water volume by 20-30% resulting in a significant reduction in ichthyoplankton mortality and a reduction in the

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

amount of bio-mass removed from Long Island Sound. Based on current modeling and as presented in project documentation, the LNG carrier ballast and cooling water intake volume is approximated to be 21.6 MGD. We note that this is a worst case value for existing steam vessels and expect that this volume will be greatly reduced as "next generation" LNG carriers are commissioned and begin to service the Broadwater Facility. Based on current LNG vessel capabilities, Broadwater anticipates cargo shipments 2-3 days per week, when a carrier will be offloading LNG at the Broadwater Facility, and taking on ballast water to offset the product transfer. By incorporating a request to reduce these volumes into the Broadwater Terminal Regulations, the ballast water intake volume for the current generation of steam vessels can be expected to be reduced to a range from 15.12 (30% reduction) to 17.28 (20% reduction) MGD. Actual volumes of ballast water taken onto the LNG vessels will be recorded and reported to NYSDEC on an annual basis. This is further discussed in section 5 below.

- **FSRU Ballast Water Management Practices.** As part of the Broadwater Terminal Regulations, Broadwater will limit ballast water volumes withdrawn from the Long Island Sound to the minimum quantities required for safe operation and maneuverability of the FSRU. The opportunities to take on reduced ballast water volumes will be most prevalent in the summer months when met-ocean conditions in Long Island Sound are the most benign. Broadwater's potential to reduce ballast water usage also corresponds to seasons when ichthyoplankton densities are likely highest. Implementation of these ballast water management practices will lead to an expected reduction of ballast water intake of 15-20%, and will be monitored through best practices on board the FSRU. Actual volumes of ballast water taken onto the FSRU will be recorded and reported to NYSDEC on an annual basis.

- **Decrease in Seawater Chlorination**. In addition to the operational adjustment for reducing ballast water intake, Broadwater has also committed to a design change on the FSRU to further minimize ichthyoplankton impacts, pending approval from NYSDEC. If approved, Broadwater will implement a redesign of the water intake structures and install four water intakes rather than two intakes, as previously proposed. Each of the four water intakes would incorporate the 1-inch external grill, and internal 5 mm flat panel mesh screen as discussed in Item 1 above. This design change will result in no additional intake volume and no increase in flow velocity. This redesign provides Broadwater with the ability to designate two intakes solely for the purpose of ballast water intake, with the remaining two intakes providing water for daily FSRU operational needs. The two intakes that will be used for ballast water uptake ***will not be treated with sodium hypochlorite***, resulting in a

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

significant reduction in the amount of treated seawater being discharged from the facility. Additionally, the elimination of chlorination will also increase the likelihood that ichthyoplankton entrained through these two water intake structures can survive passage through the ballast water system and will be returned to Long Island Sound.

These water use reductions all result in a decrease in the impact that the Broadwater Facility would have on the aquatic environment of Long Island Sound. As a result of implementing these practices, Broadwater will not only reduce total ichthyoplankton mortality, but will also reduce the volume of water discharged from the FSRU that has been treated with sodium hypochlorite. As noted above, the ballast water management practices are weather dependent, and safe navigation and operation are of utmost priority. In general, all of these water reduction practices associated with ballast water management will be implemented and would be most beneficial in the summer months when weather conditions are the most benign and when ichthyoplankton densities are the highest, which provides the greatest seasonal ecosystem benefit. An evaluation of the reduction in ichthyoplankton impacts resulting from these design and operational changes is presented in Item 3 below.

3. Reduction in Ichthyoplankton Impacts

Based on past correspondence received from NYSDEC, Broadwater wishes to respond to a perceived mischaracterization that has persistently been reflected in the project record. As part of the Broadwater FERC application process, numerous reports and analysis were submitted to federal and state agencies quantifying the conditions of the Long Island Sound fishery and the ichthyoplankton community present. These reports also included calculations projecting the potential impact that operation of the Broadwater Facility would have on the aquatic ecosystem. These calculations included data from many different locations in Long Island Sound under various sampling scenarios including inshore shallow waters, day and night sampling events and sampling at different times of the year. As noted in the NOIA letter received from NYSDEC on February 8, it was noted that "Taken together these intakes are projected to destroy approximately 274 million aquatic organisms annually." We strongly believe this conclusion is a mischaracterization and misrepresentation of the data Broadwater has provided on the project record, and does not accurately reflect a reasonable range of anticipated mortality resulting from facility operation. In our opinion, the NYSDEC stated value is overly conservative due to numerous considerations and aspects of the data including:

- The NYSDEC stated mortality value is based on ichthyoplankton densities derived from a subset of the Poletti data that includes shallower nearshore waters which are biologically very different than the location of the Broadwater Facility, which is located in the center of Long Island Sound at a water depth of 90 feet. The deep water data subset collected as part of

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

the Poletti dataset is more representative of anticipated conditions in proximity to the FSRU.

- The NYSDEC stated mortality value is based solely on the highest densities captured in samples. This extremely conservative value assumes that 24-hour ichthyoplankton densities can be extrapolated from measured daytime densities, when in fact significant variation occurs between daytime and nighttime densities. We believe that the conservative values stated by NYSDEC are an inaccurate presentation of the range of results Broadwater provided in their application.
- While the Poletti samples used for the analysis provide the greatest library of ichthyoplankton data available for Long Island Sound, and provide for the opportunity to establish a reasonable baseline of current conditions, samples collected as part of the Poletti program were depth integrated (or additive) and consider densities in the entire water column and not the densities at the depth location where Broadwater would actually take water in for facility water use. In reality, ichthyoplankton are not evenly distributed throughout the water column. Broadwater has specifically designed water intake structures that withdraw water from the middle of the water column which is expected to have the lowest density of ichthyoplankton.

Overall, NYSDEC's finding of significant adverse impact due to entrainment of fish eggs and larvae is arbitrary and not based in the scientific context of fisheries biology and how this applies to ichthyoplankton densities found in Long Island Sound. The conservative elements listed above are typically assumed for entrainment impact analysis at steam electric generating stations due to the lack of site specific information, although considerable evidence suggests that egg and larval entrainment survival at steam electric plants can be substantial (i.e. 20-90%, see reviews by EPRI 2000 and USEPA 2004). Broadwater does not disagree that the conservative elements listed above should be considered for the entrainment impact evaluation. However, results of such an analysis need to be accounted for in concert with known mortality outcomes to ensure the most robust data set that can lead to a reasonable conclusion. Additional information outlining the details of Broadwater's complete and thorough impact evaluation as provided on the project record detailing fishery conditions and anticipated entrainment impacts at the facility is provided in **Attachment 1.**

In addition, based on the water use reduction practices outlined in Item 2, Broadwater has recalculated the anticipated entrainment impacts for the facility and they are presented here as **Attachment 2**. Overall, annual entrainment estimates under the current water use level of 28.2 MGD total 112,375,000 fish eggs and larvae. With the implementation of the proposed flow reductions for the FSRU and LNG carrier, annual impacts would decrease to a value as low as 81,292,000 fish eggs and larvae. Also, under the current water use level of 28.2 MGD, annual adult equivalent loss totals 57,953, while

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

flow reductions for the FSRU and LNG carrier would reduce the annual impact to a value as low as 41,923 adult equivalents lost.

4. Ichthyoplankton Monitoring Program

The potential long range ichthyoplankton impacts resulting from operation of the FSRU facility have been identified as a concern by resource agencies. As stated in previous submittals, and supported by the FERC EIS, these impacts are not expected to be significant, particularly in light of other major water users in the Sound, such as the Millstone Nuclear Power Plant. Nevertheless, we are committed to working with NYSDEC to characterize the actual impact which will result from operation of the FSRU. By developing a project specific sampling program that establishes both baseline conditions and post-construction impacts, we will be able to contribute significantly to the research in understanding the ichthyoplankton communities in central Long Island Sound and demonstrate that operation of the FSRU will not have significant adverse impacts on the long term community health in Long Island Sound.

Broadwater will commit to development and implementation of an Ichthyoplankton Monitoring Program that could be initiated, subject to receipt of project permits from NYSDEC, in the fall of 2008, and continue through the fall of 2010, thus establishing two years of baseline data prior to the start-up of facility operations. Following facility start-up, Broadwater would then collect site-specific samples for an additional 3 years to characterize the impact on the ichthyoplankton community, which is expected to be less than the values reported by NYSDEC in the NOIA. This sampling program would target the facility location in central Long Island Sound, and will be designed to stratify sample depths so that results can be accurately interpreted and evaluated, since the water intake structures on both the FSRU and LNG carriers are located at a mid-water depth of approximately 40 feet. As noted above, the Poletti data used depth integrated samples and, as such are representative of total numbers found throughout the entire water column and were not depth specific. The Broadwater Monitoring Program will be designed to accurately define the ichthyoplankton densities that would be directly impacted by water intake on the FSRU and LNG carriers. Development of this monitoring program would be done in coordination with NYSDEC and all data would be submitted to NYSDEC for review on a yearly basis.

5. Facility Water-Use Reporting

As discussed above, all operational procedures that are required by the Broadwater Facility will be established through Broadwater Terminal Regulations, which form part of the overall Operations Manual. The Operational Manual is required under 33 C.F.R. § 127.305 to be submitted to the Captain of the Port ("COTP") Long Island Sound, for review and approval, at least 6 months, but no more than 12 months before the FSRU would receive LNG deliveries. Broadwater plays an active role in the development and review of the Operations Plan, but it will be the USCG that has final

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

authority to accept, or reject, any proposals related to safety, security and navigational matters. Once approved, the Operations Plan, and therefore the Broadwater Terminal Regulations, is binding on Broadwater and non-compliance will subject Broadwater to potential sanctions and other enforcement action.

The USCG exercises regulatory authority over LNG facilities with respect to the safety and security of port areas and navigable waters under Executive Order 10173, the Magnuson Act, the Ports and Waterways Safety Act of 1972, as amended, and the Maritime Transportation Security Act of 2002. The USCG is responsible for matters related to navigation safety, vessel engineering and safety standards, and all matters pertaining to the security of facilities or equipment located in or adjacent to navigable waters. The USCG also has authority for LNG facility security plan review, approval and compliance verification as provided in Title 33 CFR, Part 105, and siting as it pertains to the management of vessel traffic in and around the LNG facility.

As indicated above, Broadwater will monitor and report annually the ballast water volumes taken on by both the FSRU, and LNG carriers delivering at the facility. These vessels would take on enough ballast to ensure safe travel out of Long Island Sound and into Federal waters. Any remaining ballast needed would be taken on once the vessel has left the facility, thus minimizing impacts from ballast water intake to the waters of Long Island Sound.

Broadwater will commit to adding the following paragraph to the Broadwater Terminal Regulations to enforce water use reduction practices:

LNG Carrier Ballast: To the extent safe navigation, maneuverability, and vessel stability permits, *Broadwater requests that all LNG vessels minimize the amount of ballast taken on board while berthed at the Broadwater FSRU.*

Strategies to reduce the uptake of ballast water include but are not be limited to:

a) Taking on board a reduced amount of ballast while alongside.

b) If under keel clearance allows, the taking on of additional ballast prior to arrival at the berth.

No action to reduce ballast water uptake shall be implemented at the expense of prudent safety of navigation, maneuverability, or vessel stability, considering both the Long Island Sound transit(s) and ocean passage for the existing or anticipated environmental circumstances.

The terminal will request and record the following information upon cargo transfer completion for each vessel:

a) The total capacity of ballast that the vessel could load.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

b) What ballast water reduction measures were implemented

c) The amount of ballast taken while alongside.

d) The percentage of ballast water uptake resulting from minimization strategies.

The above data shall be recorded on the terminal vessel log and an annual report provided to NYSDEC at the close of each year for three years following commissioning.
Cooling Water Uptake: *Broadwater requests that* ***to the extent practicable****, all LNG vessels minimize the amount of cooling uptake and discharged whilst berthed at the Broadwater FSRU.*

As there is typically no gauging or measurement available for cooling water uptake, no reporting will be required or offered until or unless such measurement systems become available aboard vessels.

No action to reduce cooling water uptake shall be implemented at the expense of prudent safety or engineering limitations.

By including the text within the Broadwater Terminal Regulations, Broadwater is committing the project to this action. Any non-compliance with the action detailed would leave the project subject to sanction by the USCG.

6. Sustainability Programs

Broadwater will implement design and operational adjustments as discussed above to minimize and eliminate impacts to the Long Island Sound ecosystem to the maximum extent possible within the bounds of proven marine technology. Even with the mitigation measures implemented, some minimal impact to the Long Island Sound ecosystem and associated fishery may still occur.

Subject to receipt of project permits from NYSDEC and commitment to construct, Broadwater agrees to develop and finance programs to promote the sustainability of commercial species in Long Island Sound. Research conducted by Broadwater, and discussions with NYSDEC and New York State Department of State have resulted in initial feedback and input on the types of programs that would be best suited for implementation in Long Island Sound, based on the needs of the ecosystem and the success rate of a given program. Stocking programs and other direct input efforts for a given commercial species do not have a very high success rate since external variables (e.g., temperature, dissolved oxygen, food availability) are difficult to control in an open ocean environment such as Long Island Sound. Broadwater has proposed other potential projects that could be implemented depending on final input received from NYSDEC. In general, the potential programs proposed by Broadwater have a higher success rate and would result in a more direct and measurable biological benefit to the Long Island Sound

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

ecosystem and a greater long-term monetary benefit to its commercial fishermen. Options for programs include potential combinations of the following:

- Tag buy-back program;
- V-notching of lobsters to promote sustainability of the depleted lobster population;
- Sea grass bed restoration to provide habitat for spawning of commercial species; and
- Lobster Management Program encompassing v-notch, tag buy back, habitat restoration, and artificial reef creation.

Further, Broadwater is committed to continue engagement with NYSDEC on these potential programs and working toward a cooperative agreement to implement the programs that will have enduring benefit to the Long Island Sound ecosystem and its users.

SPDES Application

Outlined below are responses to specific comments presented in the NOIA received February 8, 2008 related to the SPDES Application submitted to NYSDEC on December 12, 2007.

1. Outfall 009 Hydrostatic Test Water – As noted in the SPDES application on pages 2-14 and 2-15, the hydrostatic test water placed in the pipeline will contain a biocide. The biocide product is known by the trade name - Tetrakis hydroxymethyl phosphonium sulfonate (THPS). The THPS-based biocide has been successfully used in other locations for underwater pipeline installation, including the installation of the Hubline in the State of Massachusetts in 2003. The method of detoxification of the biocide in the proposed hydrostatic discharge is outlined on page 2-15 of the SPDES application submitted by Broadwater on December12, 2007 and is provided below.

   The toxicity of biocides will be neutralized to avoid adverse effects on the environment after discharge. Prior to pipeline commissioning, the hydrostatic test water will be pumped to holding tanks on a support vessel on the surface for treatment/neutralization with a neutralizing chemical which is hydrogen peroxide. After allowing time for adequate neutralization, the hydrostatic test water will be re-oxygenated (e.g., through use of a diffuser) and discharged into the Sound. The rate of discharge back into the sound is estimated to be 2,000 gallons/minute (7.6 m^3/minute). A rate of 4,000 gal/min was incorrectly noted in the NOIA comment letter.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

No swabbing chemicals/drying agents will be used during the dewatering process. Only clean, filtered, oil-free air will be used for the displacement of dewatering pigs. The hydrostatic test water will not be directly discharged from the pipeline into the marine environment; it will be neutralized prior to discharge. Therefore, the hydrostatic testing and dewatering process will have no impact on the water quality of the Sound and only represents a one time water exchange that will be removed and returned over a seven-month period.

2. Outfall 006 IG Scrubber overboard - The inert gas (IG) scrubber is used only infrequently when an LNG cargo tank needs to be purged for cleaning and/or inspection. During this process, an insert gas is pumped into the LNG tanks. Water from the sea chest is used to "clean" and cool the inert gas stream used to purge the tanks before it actually enters the tank.

   The inert gas stream is created by a generator which has a capacity of 4,500 Nm3/h of inert gas, which is based on one tank operation of drying, inerting, and aeration within each 20 hours. The inert gas is produced by the stoichiometric combustion of fuel oil and air in a combustion chamber with the combustion air force fed into the combustion chamber by blowers and the oil injected by means of a gear pump. It is anticipated that the inert gas system will be required for storage tank inspection no more than once in every 5 years for each tank.

   During the process of inert gas creation, the inert gas stream is sent through the IG scrubber as noted above to "clean" and cool the product before it enters the LNG tank. No additives are used in the process and no chemical pollutants will be present. The use of the IG scrubber would occur approximately once every 5 years. Water usage is estimated to be approximately 290,000 gallons/hr (1,100 m^3/hr), with a total of approximately 11.6 million gallons (44,000 m^3) required for a single purge of the entire FSRU (all LNG tanks). The waste water from the inert gas scrubber is expected to have a pH ranging from 5.5 to 6, a temperature rise of about 11° C with little to no particulate matter present. Prior to discharge, this water will be treated as necessary to conform to NYSDEC discharge requirements for pH and temperature as well as processed through an oil-water separator to ensure no residual products in the scrubber water from the combustion process. Therefore, no impacts on water quality are anticipated.

3. Industrial Application Form NY-2C Section III (pages 1-12 to 1-14) – The effluent parameters for Outfalls 001 – 010 for the Broadwater FSRU have been characterized to the extent possible in **Attachment 3** of this letter.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Broadwater will work in conjunction with NYSDEC to refine this parameter list as the project draws closer to the initiation date of operations since the quality of the receiving waters of Long Island Sound may be subject to change in the next two-years. As previously stated, Broadwater's planned start-up date for operation of the FSRU is the fourth quarter of 2010. Broadwater will adhere to any changes in effluent parameters based on site-specific water quality and have committed to operation of the FSRU within NYSDEC discharge requirements.

If there are any questions concerning the attached information, please feel free to contact me at 713.241.3448.

Jimmy Culp
Broadwater Project Director

cc: Robert Alessi (Dewey & LeBoeuf)
John Hritcko (Broadwater)
Sara Allen-Mochrie (Ecology & Environment)
William Little (New York State Department of Environmental Conservation)
Jeffrey Zappieri (New York State Department of State)
Jim Martin (Federal Energy Regulatory Commission)
Naomi Handell (United States Army Corp of Engineers)
Lingard Knutson (United States Environmental Protection Agency)

Attachments:

1. Ichthyoplankton Impacts – Clarification of Facility Entrainment Impacts
2. Ichthyoplankton Impacts - Flow Reduction Entrainment Estimates/Equivalent Adult Losses
3. SPDES Permit – Effluent Parameters

99301

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Attachment 1
Broadwater Clarification of Facility Entrainment Impacts

1. Ichthyoplankton Densities in Long Island Sound

A range of entrainment scenarios for the proposed Broadwater facility were provided in application materials in order to present a full range of available information. All of the entrainment scenarios included substantial conservative elements such as entrainment being proportional to density, all organisms being alive at the time of entrainment with subsequent 100% entrainment mortality, no density-dependent compensatory response at the population level (e.g. Rose et al. 2001), and no escape or avoidance behavior (negative rheotaxis). The conservative elements listed above are typically assumed for entrainment impact analysis at steam electric generating stations due to the lack of site specific information, although considerable evidence suggests that egg and larval entrainment survival at steam electric plants can be substantial reduced (i.e. 20-90%, see reviews by EPRI 2000 and USEPA 2004). Methods for estimating the magnitude of entrainment overestimation resulting from neglect of these elements are not currently available and Broadwater does not disagree that the conservative elements listed above should be assumed for the entrainment impact evaluation. However, we do disagree with a number of other overly conservative estimates that the NYSDEC has compiled into their annual entrainment estimate of 270 million eggs and larvae at the Broadwater facility which was qualified in detail in formal submittals as a "worst-case" scenario that was very unlikely to occur but was calculated to show the complete range of available data. (*see FERC Environmental Information Request (EIR) 2-8*). In our opinion, NYSDEC has misinterpreted, and mischaracterized, the information provided in the Broadwater application, over estimated the entrainment impact, and did not acknowledge the more appropriate (yet still conservative) estimates provided. We do not believe that NYSDEC's finding of "significant adverse impact" due to entrainment of fish eggs and larvae is based on a scientific context in regards to fisheries biology.

The entrainment estimates developed by Broadwater were based on ichthyoplankton (fish eggs and larvae) density values obtained from two sources representing the best and most recent data available: the Poletti Ichthyoplankton Program (Poletti) and site specific monitoring in 2005 and 2006 (site specific). The Charles Poletti Power Plant, owned by the New York Power Authority (NYPA) sponsored an extensive ichthyoplankton program to provide data on the distribution of fish eggs and larvae in Long Island Sound, East River, Hudson River and New York Harbor during March-July 2002. In the evaluation and presentation of the Poletti data, the entire study area was subdivided into ten (10) "Regions", to provide geographical context to the data. Specific to the Broadwater analysis, a subset of regions from the larger data set was evaluated to assess the ichthyoplankton community likely to be present in the Central Basin of Long Island Sound which generally can be characterized as the source water body for the FSRU facility. The proposed FSRU location is near the nexus of Poletti Regions 7, 8, and 9 in the Central Basin. Therefore, all three regions were included in the subset analysis to

increase robustness of the data set by including more samples. As described in the Broadwater Application to FERC, each of the 10 sampling regions in the program were subdivided into the following sampling strata depending on the available total water depths (bottom depth) in the region: Shallow (3-6 m bottom depth), Intermediate (6-30 m bottom depth), and Deep (>30 m bottom depth). The Shallow, Intermediate, and Deep sampling strata refer to the overall depth of the water column from surface to bottom and not to the position in the water column from which a sample was taken. Within each sampling stratum of each sampling region, the specific sampling locations and depth within the water column were randomly selected. Instead of analyzing each field sample individually, a single composite sample was analyzed from the combined contents among all of the samples collected by the same gear (tucker trawl or epibenthic sled) in each region and sampling stratum in each of eleven biweekly surveys.

Therefore, during the process of assessing potential impacts resulting from the operation of the Broadwater facility, it was not possible to select individual samples collected in the vicinity of the proposed FSRU location, or to select individual samples from specific depths corresponding with proposed water intake depths since the Poletti samples were combined into composites for analysis and data presentation. We believe, and as discussed in previous submittals, that the most appropriate extrapolation of the data that characterizes the facility's location in 95 feet of water, 9 miles from shore in the middle of the Central Basin of Long Island Sound, is the use of the Poletti subset for the deep (> 30 m or 98 ft) sampling stratum. Within this subset of data we limited our analysis to ichthyoplankton samples collected with a Tucker trawl. This data provides a composited assessment of the ichthyoplankton communities present throughout the water column, from the surface to 3 meters above the bottom. As designed by Broadwater, all water needed for ballast and daily facility operations for both the FSRU and LNG carriers will be withdrawn from a mid-water column depth of 35-45 feet below surface. Although a case could be made that the Poletti intermediate depth (6-30 m, 20-97 ft) sampling strata represents the FSRU location at the upper end of its depth range, these composites included samples from water as shallow as 20 feet bottom depth and, as such we do not believe that they are not representative of the proposed FSRU intake location in deep water in the middle of Long Island Sound.

We believe that the scientific community accepts, and that the data demonstrates that facilities withdrawing water from nearshore areas typically have greater ecological impacts compared to intakes located offshore since nearshore areas are more biologically productive and have higher concentrations of marine organisms (USEPA 2004). In the Poletti dataset, ichthyoplankton densities were indeed greater (average density over the entire survey was 2.4 times greater) in the intermediate depth strata compared to the deep strata (**Figure 1**). Therefore, in our opinion, by exclusively selecting this dataset, we believe that NYSDEC is basing there conclusions on a biased, overly conservative, estimate that was provided in order to bound a range of impacts that might be expected if the facility was located closer to shore. We believe that the most scientifically valid data available to provide entrainment impact estimates during the June-July period is provided by the Poletti data subset to represent the Deep sampling strata in the Central Basin of Long Island Sound based on bottom depth and distance from shore at the FSRU facility.

The original Poletti ichthyoplankton sampling design included both daytime and nighttime sampling. This design was modified after negative interactions with commercial lobsterman during the first bi-weekly survey, and all samples after the initial survey were collected only during daylight to enable crews to avoid lobster gear.

Within the scientific community, it is generally understood that ichthyoplankton move throughout the water column in response to various stimuli and throughout the course of a day. We believe that this must be taken into account in assessing the true impacts that would occur from operation of the FSRU. In site-specific samples conducted by Broadwater at the proposed FSRU location in August and October, 2005, bay anchovy eggs and larvae and fourspot flounder larvae density were significantly higher at night. However, Atlantic menhaden eggs and larvae (a dominant species in the Poletti dataset) were collected in significantly higher density during the day. No other abundant species demonstrated a significant diel difference. Because of the confounding effects in selecting either the daytime or nighttime samples and lack of evidence to support doing so for species other than bay anchovy and fourspot flounder, we suggest that the most appropriate density estimate is obtained by averaging the day and night collections from the site specific data. We do not believe that NYSDEC considered estimates based on this average density and instead utilized only the nighttime density from the site specific collections in their entrainment estimates for the August-May period.

In order to address possible diel bias in the daytime Poletti data, our analysis included an adjustment factor for bay anchovy eggs and larvae and fourspot flounder larvae. Because eggs are not capable of gear avoidance, the most likely explanation for diel differences in bay anchovy eggs is the 24-hour pattern in egg abundance generated by nocturnal spawning behavior. As part of Broadwater's site-specific data collection effort, mean bay anchovy egg density was 13.1 times greater at night than during day in the site-specific August 2005 collections, therefore a correction factor of 6.6 was applied to the bay anchovy egg entrainment estimates generated from the daytime Poletti sampling. Mean bay anchovy larvae density was 12.9 times greater at night during the August, 2005 site specific sampling event and was 5.4 times greater at night during the October, 2005 site specific sampling event. To account for this diel difference in our analysis, entrainment estimates generated from daytime Poletti samples subset were increased by a full order of magnitude (times 10) to account for a daytime bias. Fourspot flounder larvae were collected in significantly higher density (2.3 times higher) at night compared to daytime in the August, 2005 site specific collections, therefore daytime density values for fourspot flounder larvae from the Poletti data were multiplied by 2.3.

To further address possible biases in the Poletti ichthyoplankton dataset, a net extrusion adjustment was applied for the purposes of the Broadwater analysis. Net efficiency is complex and varies with species, ontogeny, ambient light, hydrodynamic conditions, condition factor of the individual ichthyoplankton and the velocity at which the gear is towed. With the use of plankton nets, there is a tradeoff in mesh size selection; larger meshes may allow a fraction of the eggs and larvae to pass through while smaller meshes clog faster and create a larger pressure head at the net of the mouth that may increase sensory perception and gear avoidance by larvae and divert water from entering the net. The 0.500 mm mesh used in the Poletti program likely allowed a portion of smaller

ichthyoplankton to pass through, and an argument could be made that density and entrainment estimates may be underestimated. An entrainment study was conducted at Poletti Station by NYPA in which the discharge from the 0.500 mm sampler was then passed through a 0.200 mm mesh to collect any organisms that passed through the 0.500 mm mesh. Results indicated that while all larvae • •7 mm were retained by the 0.500 mm mesh, some larvae from four taxa with small larval sizes (bay anchovy, Atlantic menhaden, winter flounder and goby species) were extruded through the 0.500 mm mesh. A species-specific net extrusion adjustment was applied to the Poletti Program density values for bay anchovy, Atlantic menhaden, winter flounder and goby larvae based on 1 mm length frequency distributions in each biweekly sample using the empirical NYPA mesh extrusion data to address this potential underestimation.

The entrainment estimate of 270 million individuals, which is the only value that NYSDEC has referred to in NOIA correspondence, and which we assume is the basis for the "significance" determination, represents eggs and larvae annually but does not consider the range of possible estimates provided in a letter report submitted on May 11, 2006 (**Table 1**) summarizing both the Poletti and site specific collection data through March, 2006. These entrainment estimates were provided separately (i.e. not summed to an annual total) for both the Poletti and site-specific monitoring programs under a range of depth strata and diel scenarios in order to present all available information for discussion of potential impacts.

It would appear that NYSDEC selected the "worst-case" scenario which yields an annual estimate of 270 million eggs and larvae and did not qualify this number with any scientific explanation to indicate this values was more than twice as high as the estimates based on the more representative deep strata of the Poletti data and the average of day and night sampling for the site specific data that were outlined in EIR 2-8 and the letter report that was provided as an attachment to that submittal.

At the time of this data compilation, site specific data collected in April and May, 2006 were not available. We believe that a more appropriate annual sum is available by utilizing this site-specific information for April and May rather than relying solely on the Poletti data. A more appropriate, less biased estimate of ichthyoplankton density, incorporating the diel and net extrusion adjustments discussed above, based on the combined Poletti and site specific collections is allocated for an annual period in **Table 2**. These density values were multiplied times the daily flow of the combined FSRU (6.6 MGD) and LNG carriers (21.6 MGD, total= 28.2 MGD) to yield a more appropriate annual sum of approximately 40.5 million eggs and 71.8 million larvae for a conservative total annual entrainment estimate of 112 million eggs and larvae combined. These estimates are provided for each species and lifestage for each month in **Table 3**. This total is less than ½ of the value noted by NYSDEC. Overall entrainment numbers were dominated by bay anchovy (35.8%), Atlantic menhaden (16.9%) and fourbeard rockling (12.2%). Species collected that are the target of recreational fisheries in Long Island Sound (Atlantic mackerel, black seabass, scup, tautog, weakfish, winter flounder) combined account for only 14.7% of the total (**Table 3**). Monthly entrainment estimates are summed for all species and lifestages and presented with a range of potential water flow reduction scenarios for the FSRU and LNG carriers in **Table 4**.

Rather than objectively weighing the available information provided in the submitted reports that were provided to the project record in 2006 and throughout 2007, which would have provided the most complete and appropriate, site specific estimates; it would appear that NYSDEC identified the largest values presented in the May 11, 2006 report (**Table 1**) and classifies the impact as "significant" with no supporting biological context or definition of "adverse environmental impact."

In our opinion, context is essential to understanding what significant or adverse environmental impact may mean with regard to fish populations. As a matter of basic fishery science and logic, losses, even large numbers (i.e. millions or billions) of early life history stages or marine organisms, do not necessarily imply significant adverse impact. This is because most marine fish species are characterized by extremely high fecundity with subsequent high natural mortality in the egg and larvae stages in contrast to most mammals or birds which invest large amounts of energy into a few offspring with high survival rates. Entrainment losses consist primarily of eggs and larvae, a small fraction of which would survive to adulthood or even their first birthday due to high natural mortality rates. Using a well described species (striped bass) as an example: a mature striped bass may contain nearly 5 million eggs (Hoff et al. 1988, Olsen and Rulifson 1992) and since striped bass can live up to 30 years, a single fish could potentially spawn tens of millions of eggs over her lifespan. Early life history survival estimates by Secor and Houde (1995) imply that more than 99.9% of young striped bass die from natural causes within 60 days after spawning, i.e. less than one striped bass egg in 100,000 is likely to survive to its first birthday, and less than one in a million is likely to survive to maturity (6 years). Another example, bay anchovy (the most abundant species in the western North Atlantic and a dominant species in the entrainment estimates) spawn every few days (up to 50 times in a season) over an extended period from late spring through early fall. A mature female bay anchovy may produce up to 1,000 eggs per spawn and nearly 1 million eggs throughout her lifetime, approximately 99.6 % of which will not survive to their first birthday due to natural mortality (Barnthouse 2005). Nearly all (~99.9%) marine fish eggs and larvae are likely to die from natural causes, such as predation or starvation, prior to adulthood with only a fraction surviving to reproduce or be harvested by fishermen (EPRI 2004). Therefore, counts of raw entrainment numbers without population level context reveal nothing meaningful about potential impact and do not provide an objective or weight of evidence approach to the scientific conclusion.

2. Facility Water Use

The proportion of water use by a facility is often placed in context to the source water body to derive a conservative estimate of the potential for adverse impact (Goodyear 1977 cited in USEPA 2004). For example, withdrawal of 5% of the source water flow may be expected to result in a loss of 5% of the planktonic organisms based on the assumption that organisms are uniformly distributed. The currently design daily withdrawal rate of (28.2 MGD) by the proposed FSRU facility and associated LNG carriers represents only 0.0003 % of the volume of water in the source water body (defined as Regions 7-9 in the Poletti survey). As a further basis of comparison to water

use by other facilities in Long Island Sound, Northport Generating Station and Port Jefferson Power Plant on Long Island withdraw 926 and 408 MGD respectively from more productive nearshore areas of the Sound compared to 6.6 MGD by the proposed FSRU and 21.6 MGD by the LNG carriers (28.2 MGD total) from deep waters 9 miles from shore. Millstone Generation Station in Waterford CT withdraws 2,189 MGD from nearshore areas of the Sound with an average annual entrainment (average over 1996-2005) of over 5 billion fish eggs and larvae per year with no observable impact on marine fish or invertebrate populations in Long Island Sound despite an extensive annual monitoring program with input from various regulatory and academic institutions (NUSCO 2006, 2007).

In 2005 alone, the Millstone facility entrained 1.6 billion Atlantic menhaden larvae (NUSCO 2007). Impact assessment modeling of Atlantic menhaden at Millstone indicated that the population could withstand losses of 210 million juveniles (post larval stages prior to reproductive maturity) for 50 consecutive years with a projected reduction of only 0.08-1.1% in abundance and it is concluded that this loss would not be detrimental to the Atlantic menhaden population and would likely not even be detectable by field observations (NUSCO 1983). This kind of population level response is typical of highly fecund "r selected" species with high egg and larval mortality rates such as most marine fish and invertebrates and illustrates why seemingly large raw entrainment numbers (i.e. in the millions or even billions of eggs and larvae) are insufficient to adequately describe adverse environmental impact without context to the overall population, source water body, species specific demographics, and other anthropogenic impacts.

3. Equivalent Adult Model

The Equivalent Adult Model (EAM) is a method for expressing ichthyoplankton entrainment losses as an equivalent number of individuals at some other common life stage (Goodyear 1978, Saila et al. 1997, EPRI 2004, USEPA 2004). Equivalent adult losses are estimates of the number of entrained fish removed from a population that otherwise would have survived natural mortality to some future age (the age of equivalence). The age of equivalency can be any life stage of interest and is typically Age 1, Age of sexual maturity or Age of entry into a fishery. This method provides a convenient means of converting estimated losses of fish eggs and larvae into units of individual fish and is commonly used to provide a standard metric for comparing losses among species, years, and facilities (USEPA 2004). EAM estimates provide a biological and human use context that is more easily understood, valued and incorporated into science based decision making than raw loss estimates (EPRI 2004). USEPA and NYSDEC routinely request adult or Age 1 equivalents for entrainment evaluation at steam electric power stations for 316(b) requirements in order to better characterize raw entrainment numbers.

The EAM calculation requires life-stage specific entrainment counts and life-stage specific mortality rates from the life stage of entrainment to the life stage of equivalence.

The losses at any given stage are multiplied by the fraction of fish at that stage or age that would be expected to survive to the age of equivalence:

$$EA = S_A N$$

Where: EA = equivalent age 1 loss, N= number of fish lost due to entrainment, S_A= fraction of fish expected to survive from the age at which they are entrained to the age of equivalence. Survival rates of early life stages of fish are often expressed on a life-stage specific basis so that the fraction surviving from any particular life stage to the age of equivalency is expressed as the cumulative product of survival fractions for all of the life stages through which a fish must pass before reaching the age of equivalency. Species and lifestage specific mortality rates were obtained from the literature and are available upon request. The entrainment estimates for fish eggs and larvae in **Table 2** (28.2 MGD water withdrawal) are expressed in terms of monthly adult (age of 50% population maturity derived from the literature) equivalents for each species and lifestage in **Table 5**. Monthly entrainment estimates summed for all species and lifestages for the range of water flow reduction scenarios (**Table 4**) are expressed in terms of adult equivalents in **Table 6**.

The entrainment of 112 million fish eggs and larvae (**Table 3**) result in approximately 60,000 adult equivalents (**Table 5**). The most abundant taxa entrained in terms of adult equivalents are searobin which account for 63% of the total. Other abundant adult equivalent taxa include bay anchovy (15%), northern pipefish (6%), Atlantic menhaden (5%) and cunner (4%). Of the species entrained that are the target of valuable recreational fisheries in Long Island Sound (Atlantic mackerel, black sea bass, scup, tautog, weakfish, winter flounder), only about 1,500 (or 3% of the total) are expected to survive to age of first maturity (typically 1-2 years for most of species collected).

For a basis of comparison, recreational fisherman in New York State waters catch an average (over 2000-2006) of about 22 million fish per year (range 17-30 million) while recreational anglers in Connecticut state waters averaged about 7 million per year (range 5-10 million) over the same 7 year period (NMFS Marine Recreational Fisheries Statistics Online query: http://www.st.nmfs.noaa.gov/st1/recreational/queries/index.html).

References

Barnthouse, L.W. 2005. Parameter development for equivalent adult and production foregone models. EPRI Report 1008832 (draft).

EPRI (Electric Power Research Institute). 2000. Review of entrainment survival studies 1970-2000. EPRI Report 1000757.

EPRI (Electric Power Research Institute). 2004. Extrapolating impingement and entrainment losses to equivalent adults and production foregone. EPRI Report 1008471.

Goodyear, C.P. 1978. Entrainment impact estimates using the Equivalent Adult Approach. FWS.OBS-78/65, U.S. Department of the Interior, Fish & Wildlife Service, Washington, DC. Prepared by U.S. Fish and Wildlife Service.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Hoff, T. B., J. B. McLaren, and J. C. Cooper. 1988. Stock characteristics of Hudson River striped bass. American Fisheries Society Monograph 4:59-68

NUSCO (Northeast Utilities Service Company). 1983. Section 5.5.3.3.4.3 Atlantic menhaden. Pages 5.1-36-5.1-47 *in* Millstone Nuclear Power Station Unit 3 environmental report. Operating license stage, Volume 2.

NUSCO. 2006. Fish ecology studies. Pages 117-181 *in* Monitoring the marine environment of Long Island Sound at Millstone Power Station. Annual Report 2005, Waterford, Connecticut.

NUSCO. 2007. Fish ecology studies. Pages 121-170 *in* Monitoring the marine environment of Long Island Sound at Millstone Power Station. Annual Report 2006, Waterford, Connecticut.

Olsen, E.J., and R.A. Rulifson. 1992. Maturation and fecundity of Roanoke River-Albermarle Sound striped bass. Transactions of the American Fisheries Society 121:524-537.

Rose, K. A., J. H. Cowan, Jr., K. O. Winemiller, R. A. Myers, and R. Hilborn. 2001. Compensatory density-dependence in fish populations: importance, controversy, understanding and prognosis. Fish and Fisheries 2:293-327.

Salia, E.Lorda, J.D. Miller, R.Sher, and W.H. Howell. 1997. Equivalent adult estimates for losses of fish eggs, larvae and juveniles at Seabrook Station with use of fuzzy logic to represent parametric uncertainty. North American Journal of Fisheries Management. 17: 811-825.

Secor, D.H. and E.D. Houde. 1995. Temperature effects on the timing of striped bass egg-production, larval viability, and recruitment potential in the Patuxent River (Chesapeake Bay).Estuaries 18:527–544.

USEPA 2004. Regional analysis document for the final Section 316(b) Phase II existing facilities rule. http://www.epa.gov/waterscience/316b/phase2/casestudy/final.htm

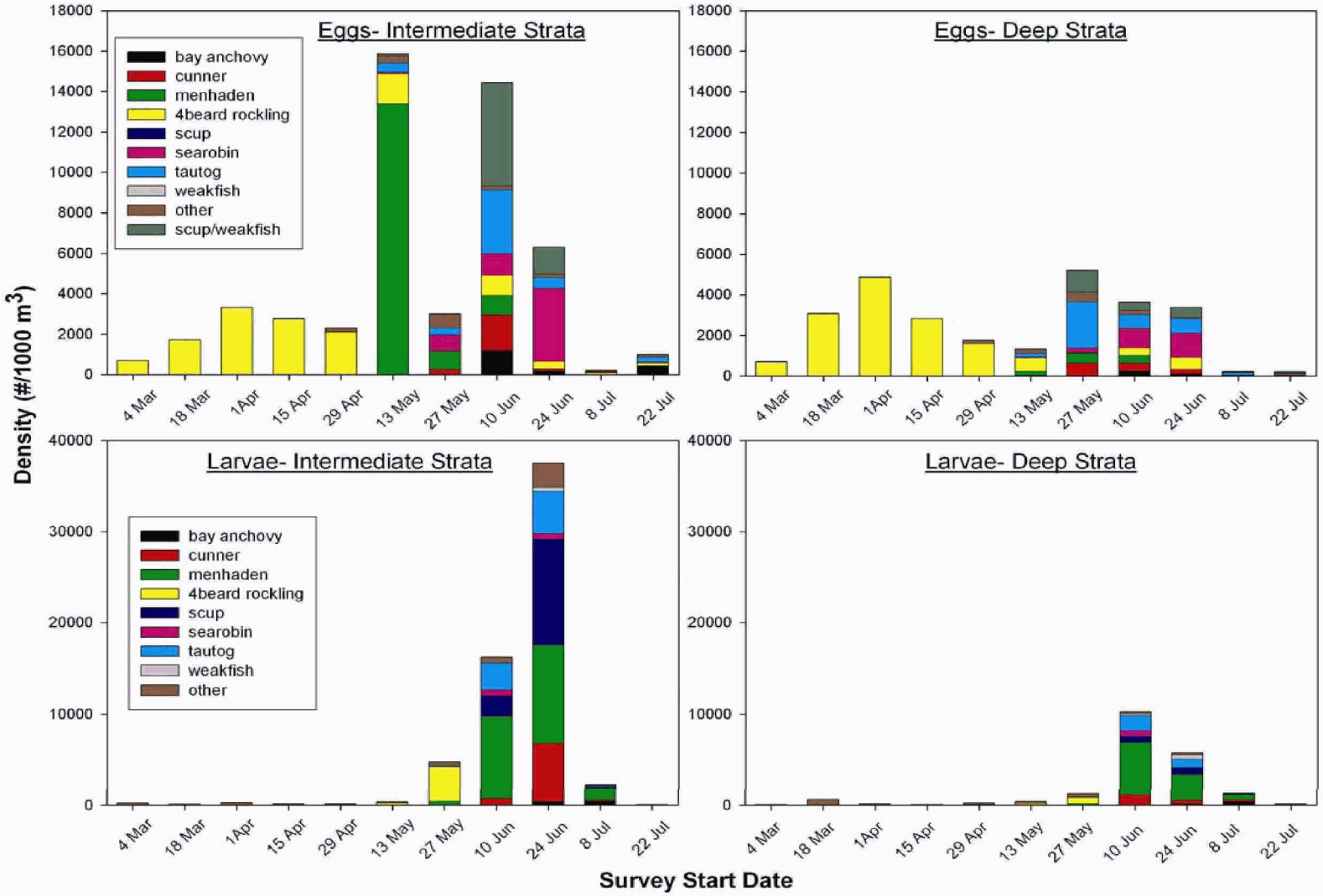

Figure 1. Mean biweekly density (#/1000m^3) of fish eggs and larvae in the Intermediate (6-30m bottom depth) and Deep (>30m bottom depth) sampling strata in Regions 7-9 of the 2002 Poletti Ichthyoplankton Program in Long Island Sound.

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Table 1. Ichthyoplankton entrainment estimates (millions) summed over all eleven biweekly surveys of the 2002 Poletti Ichthyoplankton Program and for the site specific collections in 2005-06 at the proposed Broadwater FSRU location (NOTE- this table is taken directly from Table 14 of the submitted Letter Report for Sampling Event # 4 dated May 11, 2006)

					Entrainment Estimate (millions)	
Program	**Dates Included**	**Depth sampled**	**Total Depth at Sample Location**	**Diel**	**Eggs**	**Larvae**
Poletti	March 4-Aug. 5, 2002	surface to 10 ft above bottom[d]	Deep (total depth > 98 ft)	day only	40.6	30.6
Poletti	March 4-Aug. 5, 2002	surface to 10 ft above bottom	Deep (total depth > 98 ft)	day- adjusted[a]	43.9	41.6
Poletti	March 4-Aug. 5, 2002	surface to 10 ft above bottom	Intermediate (total depth 20-98 ft)	day only	77.3	94.1
Poletti	March 4-Aug. 5, 2002	surface to 10 ft above bottom	Intermediate (total depth 20-98 ft)	day- adjusted[a]	92.7	111.8
Broadwater	Aug 1, 2005-March 31, 2006	mid-depth (35-65 ft)	~ 95 ft	day and night[b]	9.2	36.7
Broadwater	Aug 1, 2005-March 31, 2006	mid-depth (35-65 ft)	~ 95 ft	day and night[c] (eggs), night only (larvae)	9.2	61.3

[a] Poletti samples were only conducted during the day. A diel adjustment factor was applied based on analysis in Appendix A of Normandeau (2006).

[b] Broadwater samples are the average of three day and three night samples

[c] Broadwater samples are the average of (1) day and night for eggs, and (2) night only for larvae to adjust for possible gear avoidance.

[d] Poletti samples were collected from randomly selected depths within the water column and mixed into a composite sample in the laboratory within a given gear/biweekly survey/region stratum as discussed in Normandeau 2006

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Table 2. Daily ichthyoplankton density (#/1000m^3) values obtained from the 2002 Poletti Program and site specific sampling in 2005 and 2006 most representative of the location of the proposed Broadwater FSRU facility in Long Island Sound.

				Density (#/1000m^3)			
Month	Start Day	End Day	# Days	Egg	Larvae	Total	Data Source
January	1	31	31	1.0	94.5	95.5	Site Specific February 2006[a]
February	1	28.25	28.25	1.0	94.5	95.5	Site Specific February 2006[a]
March	1	31	31	1,524.8	132.7	1,657.4	Site Specific March 2006[b]
April	1	30	30	1,030.2	88.4	1,118.6	Site Specific April 2006[c]
May	1	31	31	2,672.5	724.8	3,397.2	Site Specific May 2006[d]
June	1	9	9	5,264.1	1,332.9	6,597.0	Poletti Survey # 7[e]
June	10	23	14	5,085.8	10,493.7	15,579.5	Poletti Survey #8[f]
June	24	30	7	3,927.6	7,742.8	11,670.4	Poletti Survey #9[g]
July	1	7	7	3,927.6	7,742.8	11,670.4	Poletti Survey #9[g]
July	8	21	14	248.6	4,947.7	5,196.2	Poletti Survey #10[h]
July	22	31	10	294.3	354.2	648.5	Poletti Survey #11[i]
August	1	4	4	294.3	354.2	648.5	Poletti Survey #11[i]
August	5	31	27	745.0	6,393.3	7,138.4	Site Specific August 2005[j]
September	1	30	30	401.8	3,443.2	3,844.9	Site Specific August and October 2005[k]
October	1	31	31	58.5	493.0	551.5	Site Specific October 2005[l]
November	1	30	30	58.5	47.5	106.0	Site Specific October 2005[l]
December	1	31	31	58.5	126.6	185.1	Site Specific October 2005 and February 2006[m]
			365.25				

[a] Density represents the average of six replicate samples (3 day + 3 night) collected from 35-65 feet below surface in site specific collections on February 8, 2006.

[b] Density represents the average of six replicate samples (3 day + 3 night) collected from 35-65 feet below surface in site specific collections on March 28, 2006.

[c] Density represents the average of six replicate samples (3 day + 3 night) collected from 35-65 feet below surface in site specific collections on April 18, 2006.

[d] Density represents the average of six replicate samples (3 day + 3 night) collected from 35-65 feet below surface in site specific collections on May 24, 2006.

[e] Density represents average from 11 samples collected in the Deep (• •30 m bottom depth) Strata of Poletti Regions 7-9 representing offshore areas of the Central Basin from May 27-June 9, 2002

[f] Density represents average from 11 samples collected in the Deep (• •30 m bottom depth) Strata of Poletti Regions 7-9 representing offshore areas of the Central Basin from June 10-23, 2002

[g] Density represents average from 11 samples collected in the Deep (• •30 m bottom depth) Strata of Poletti Regions 7-9 representing offshore areas of the Central Basin from June 24-Jul 7, 2002

[h] Density represents average from 11 samples collected in the Deep (• •30 m bottom depth) Strata of Poletti Regions 7-9 representing offshore areas of the Central Basin from Jul 8-21, 2002

[i] Density represents average from 11 samples collected in the Deep (• •30 m bottom depth) Strata of Poletti Regions 7-9 representing offshore areas of the Central Basin from Jul 22-Aug 4, 2002

[j] Density represents the average of six replicate samples (3 day + 3 night) collected from 35-65 feet below surface in site specific collections on Aug 23, 2005.

[k] Density represents the average of 12 replicate samples (6 day + 6 night) collected from 35-65 feet below surface in site specific collections on Aug 23 and on Oct 4, 2005

[l] Density represents the average of six replicate samples (3 day + 3 night) collected from 35-65 feet below surface in site specific collections on Oct 4, 2005.

[m] Ichthyoplankton density in December was initially based on that observed in the site specific collections in October. However, these estimates are likely overly conservative. Of the species collected in October (Atlantic menhaden and bay anchovy) only menhaden are likely to be present into December based on seasonal occurrence observed at Millstone Station (Nusco 2007). Therefore, only Atlantic menhaden were included in the density estimates for December. Of the species collected in site specific collections February (sand lance, fourbeard rockling, grubby, and rock gunnel), only American sand lance are likely to occur as early as December (Nusco 2007), so February densities of sand lance were applied to December.

Table 3. Monthly and annual total estimated number (in thousands) of fish eggs and larvae potentially entrained by the Broadwater FSRU under baseline average flow (28.2 million gallons per day, MGD).

Flow Regime Normal, MGD= 28.2

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	262	239	275	71	0	0	0	0	0	0	0	262	1108
Atlantic mackerel	**Egg**	0	0	0	0	163	0	0	0	0	0	0	0	163
	Larvae	0	0	0	0	15	44	0	120	67	0	0	0	245
Atlantic menhaden	**Egg**	0	0	0	0	2618	1049	0	0	94	194	187	194	4335
	Larvae	0	0	0	0	0	11093	2981	11	76	157	152	157	14628
Atlantic silverside	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	5	0	0	0	0	0	5
Bay anchovy	**Egg**	0	0	0	0	0	3119	632	1340	718	0	0	0	5809
	Larvae	0	0	0	0	0	1572	7709	14762	8869	1474	0	0	34386
Black sea bass	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	3	102	56	0	0	0	161
Butterfish	**Egg**	0	0	0	0	0	73	71	180	99	0	0	0	422
	Larvae	0	0	0	0	0	114	107	637	352	0	0	0	1209
Cunner	**Egg**	0	0	0	0	609	1387	245	14	0	0	0	0	2255
	Larvae	0	0	0	0	0	2066	659	58	32	0	0	0	2815
Feather blenny	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	7	1	0	0	0	0	8
Fourbeard rockling	**Egg**	3	3	5024	3299	1515	985	489	14	0	0	0	0	11332
	Larvae	0	0	0	206	1482	683	0	0	0	0	0	0	2370
Fourspot flounder	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	221	88	361	200	0	0	0	869
Gobidae spp	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	10	142	44	0	0	0	0	196
Grubby	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	2	2	0	0	0	0	0	0	0	0	0	0	4
Herring spp	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	13	6	0	0	0	0	0	19
Hogchoker	**Egg**	0	0	0	0	0	0	37	0	0	0	0	0	37
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Longhorn sculpin	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	3	3	0	0	0	0	0	0	0	0	0	0	7
Northern pipefish	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	2	7	1	0	0	0	0	9
Northern puffer	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	10	5	0	0	0	15
Rock gunnel	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	46	42	15	6	0	0	0	0	0	0	0	0	108
Scup	**Egg**	0	0	0	0	0	1298	249	0	0	0	0	0	1547
	Larvae	0	0	0	0	0	1545	662	7	0	0	0	0	2213
Searobin	**Egg**	0	0	0	0	129	2551	972	229	115	0	0	0	3995
	Larvae	0	0	0	0	0	968	69	688	382	0	0	0	2106
Smallmouth flounder	**Egg**	0	0	0	0	0	0	0	461	256	0	0	0	717
	Larvae	0	0	0	0	0	0	2	1625	902	0	0	0	2529
Striped cuskeel	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	111	61	0	0	0	172
Tautog	**Egg**	0	0	0	0	1308	3676	735	17	0	0	0	0	5736
	Larvae	0	0	0	0	94	3191	674	0	0	0	0	0	3959
Unidentified	**Egg**	0	0	0	0	0	0	0	10	5	0	0	0	15
	Larvae	0	0	0	0	0	2	11	10	5	0	0	0	28
Weakfish	**Egg**	0	0	0	0	0	699	134	0	0	0	0	0	833
	Larvae	0	0	0	0	0	688	398	25	13	0	0	0	1124
Windowpane	**Egg**	0	0	15	0	2503	756	57	8	0	0	0	0	3339
	Larvae	0	0	0	0	479	523	28	10	5	0	0	0	1045
Winter flounder	**Egg**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	149	0	330	16	2	0	0	0	0	0	496
Yellowtail flounder	**Egg**	0	0	7	0	0	0	0	0	0	0	0	0	7
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**Egg**	3.4	3.1	5,045.7	3,299.3	8,843.7	15,592.9	3,620.5	2,272.9	1,286.6	193.6	187.3	193.6	40,542.7
	Larvae	312.6	284.8	439.0	283.0	2,398.4	22,749.0	13,558.0	18,578.2	11,026.6	1,631.4	152.1	419.0	71,832.2
	Eggs + Larvae	316.0	287.9	5,484.7	3,582.3	11,242.1	38,341.9	17,178.5	20,851.1	12,313.2	1,825.0	339.4	612.6	112,374.9

Table 4. Monthly and annual entrainment estimates (in thousands) for the proposed Broadwater FSRU facility under baseline flow conditions and six potential flow reduction scenarios.

		Number of fish eggs and larvae combined (in thousands)												
Flow Regime	MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Baseline	28.20	316	288	5,485	3,582	11,242	38,342	17,179	20,851	12,313	1,825	339	613	112,375
LNGC 20%	23.88	268	244	4,645	3,033	9,520	32,468	14,547	17,657	10,427	1,545	287	519	95,160
LNGC 25%	22.80	255	233	4,434	2,896	9,089	31,000	13,889	16,858	9,955	1,476	275	495	90,856
LNGC 30%	21.72	243	222	4,224	2,759	8,659	29,531	13,231	16,060	9,484	1,406	262	472	86,553
FSRU 15%, LNGC 20%	22.89	256	234	4,452	2,908	9,125	31,122	13,944	16,925	9,995	1,481	276	497	91,215
FSRU 20%, LNGC 20%	22.56	253	230	4,388	2,866	8,994	30,674	13,743	16,681	9,851	1,460	272	490	89,900
FSRU 20%, LNGC 30%	20.40	229	208	3,968	2,591	8,133	27,737	12,427	15,084	8,907	1,320	246	443	81,292

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Table 5. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under baseline average flow (28.2 million gallons per day, MGD).

Flow Regime Normal, MGD= 28.2

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	211	192	221	57	0	0	0	0	0	0	0	211	892
	Total	211	192	221	57	0	0	0	0	0	0	0	211	892
Atlantic mackerel	Egg	0	0	0	0	<1	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	<1	<1	0	2	<1	0	0	0	4
	Total	0	0	0	0	<1	<1	0	2	<1	0	0	0	4
Atlantic menhaden	Egg	0	0	0	0	29	12	0	0	1	2	2	2	48
	Larvae	0	0	0	0	0	2160	581	2	15	31	30	31	2,849
	Total	0	0	0	0	29	2172	581	2	16	33	32	33	2,897
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	14	0	0	0	0	0	14
	Total	0	0	0	0	0	0	14	0	0	0	0	0	14
Bay anchovy	Egg	0	0	0	0	0	196	40	84	45	0	0	0	364
	Larvae	0	0	0	0	0	380	1864	3570	2145	357	0	0	8,315
	Total	0	0	0	0	0	576	1904	3654	2190	357	0	0	8,680
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	<1	25	14	0	0	0	39
	Total	0	0	0	0	0	0	<1	25	14	0	0	0	39
Butterfish	Egg	0	0	0	0	0	1	1	3	2	0	0	0	7
	Larvae	0	0	0	0	0	11	10	60	33	0	0	0	113
	Total	0	0	0	0	0	12	11	63	35	0	0	0	121
Cunner	Egg	0	0	0	0	92	209	37	2	0	0	0	0	340
	Larvae	0	0	0	0	0	1634	521	46	25	0	0	0	2,226
	Total	0	0	0	0	92	1843	558	48	25	0	0	0	2,566
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	2	<1	0	0	0	0	2
	Total	0	0	0	0	0	0	2	<1	0	0	0	0	2
Fourbeard rockling	Egg	<1	<1	42	28	13	8	4	<1	0	0	0	0	95
	Larvae	0	0	0	8	60	28	0	0	0	0	0	0	96
	Total	<1	<1	42	36	73	36	4	<1	0	0	0	0	191
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	1	<1	2	<1	0	0	0	4
	Total	0	0	0	0	0	1	<1	2	<1	0	0	0	4
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	33	469	146	0	0	0	0	647
	Total	0	0	0	0	0	33	469	146	0	0	0	0	647
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	6	5	0	0	0	0	0	0	0	0	0	0	11
	Total	6	5	0	0	0	0	0	0	0	0	0	0	11
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
Hogchoker	Egg	0	0	0	0	0	0	<1	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	<1	0	0	0	0	0	<1
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	6	6	0	0	0	0	0	0	0	0	0	0	12
	Total	6	6	0	0	0	0	0	0	0	0	0	0	12
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	658	2674	256	0	0	0	0	3,588
	Total	0	0	0	0	0	658	2674	256	0	0	0	0	3,588
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under baseline average flow (28.2 million gallons per day, MGD).

Flow Regime Normal, MGD= 28.2

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
	Larvae	0	0	0	0	0	0	0	4	2	0	0	0	6
	Total	0	0	0	0	0	0	0	4	2	0	0	0	6
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	<1	<1	<1	<1	0	0	0	0	0	0	0	0	2
	Total	<1	<1	<1	<1	0	0	0	0	0	0	0	0	2
Scup	Egg	0	0	0	0	0	125	24	<1	0	0	0	0	150
	Larvae	0	0	0	0	0	765	328	3	0	0	0	0	1,096
	Total	0	0	0	0	0	890	352	3	0	0	0	0	1,246
Searobin	Egg	0	0	0	0	288	5722	2179	513	257	0	0	0	8,959
	Larvae	0	0	0	0	0	12764	907	9068	5034	0	0	0	27,773
	Total	0	0	0	0	288	18486	3086	9581	5291	0	0	0	36,733
Smallmouth flounder	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	0	<1	8	4	0	0	0	13
	Total	0	0	0	0	0	0	<1	8	5	0	0	0	13
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	42	23	0	0	0	66
	Total	0	0	0	0	0	0	0	42	23	0	0	0	66
Tautog	Egg	0	0	0	0	<1	<1	<1	<1	0	0	0	0	1
	Larvae	0	0	0	0	3	89	19	0	0	0	0	0	110
	Total	0	0	0	0	3	90	19	<1	0	0	0	0	112
Unidentified	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
	Total	0	0	0	0	0	<1	<1	<1	<1	0	0	0	2
Weakfish	Egg	0	0	0	0	0	4	<1	<1	0	0	0	0	5
	Larvae	0	0	0	0	0	16	9	<1	<1	0	0	0	26
	Total	0	0	0	0	0	20	10	<1	<1	0	0	0	32
Windowpane	Egg	0	0	<1	0	2	<1	<1	<1	0	0	0	0	3
	Larvae	0	0	0	0	2	3	<1	<1	<1	0	0	0	5
	Total	0	0	<1	0	5	3	<1	<1	<1	0	0	0	8
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	19	0	43	2	<1	0	0	0	0	0	65
	Total	0	0	19	0	43	2	<1	0	0	0	0	0	65
Yellowtail flounder	Egg	0	0	<1	0	0	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	<1	0	0	0	0	0	0	0	0	0	<1
Total	Egg	<1	<1	42	28	425	6,279	2,287	603	305	2	2	2	9,976
	Larvae	224	204	241	66	108	18,544	7,399	13,235	7,298	387	30	241	47,977
	Total	224	204	283	93	533	24,824	9,686	13,838	7,603	389	32	243	57,953

Table 6. Monthly and annual number of adult equivalents due to entrainment of fish eggs and larvae for the proposed Broadwater FSRU facility under baseline flow conditions and six potential flow reduction scenarios.

		Number of Adult Equivalents												
Flow Regime	MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Baseline	28.2	224	204	283	93	533	24,824	9,686	13,838	7,603	389	32	243	57,953
LNGC 20%	23.88	189	173	240	79	452	21,021	8,202	11,718	6,439	330	27	206	49,075
LNGC 25%	22.8	181	165	229	75	431	20,070	7,831	11,188	6,147	315	26	197	46,855
LNGC 30%	21.72	172	157	218	72	411	19,119	7,461	10,658	5,856	300	24	187	44,636
FSRU 15%, LNGC 20%	22.89	182	165	230	76	433	20,149	7,862	11,232	6,172	316	26	198	47,040
FSRU 20%, LNGC 20%	22.56	179	163	227	75	427	19,859	7,749	11,070	6,083	311	25	195	46,362
FSRU 20%, LNGC 30%	20.4	162	147	205	67	386	17,958	7,007	10,010	5,500	282	23	176	41,923

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Attachment 2

Ichthyoplankton Implants - Flow Reduction Entrainment Estimates

Table 1. Monthly and annual total estimated number (in thousands) of fish eggs and larvae potentially entrained by the Broadwater FSRU under a 20% reduction in LNGC water use from baseline average flow (million gallons per day, MGD).

Flow Regime LNGC 20%, MGD= 23.88

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	222	202	233	60	0	0	0	0	0	0	0	222	939
Atlantic mackerel	Egg	0	0	0	0	138	0	0	0	0	0	0	0	138
	Larvae	0	0	0	0	12	37	0	102	57	0	0	0	208
Atlantic menhaden	Egg	0	0	0	0	2217	888	0	0	79	164	159	164	3671
	Larvae	0	0	0	0	0	9394	2525	9	64	133	129	133	12387
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	4	0	0	0	0	0	4
Bay anchovy	Egg	0	0	0	0	0	2642	535	1135	608	0	0	0	4919
	Larvae	0	0	0	0	0	1331	6528	12500	7510	1248	0	0	29118
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	3	87	48	0	0	0	137
Butterfish	Egg	0	0	0	0	0	62	60	153	84	0	0	0	358
	Larvae	0	0	0	0	0	97	90	539	298	0	0	0	1024
Cunner	Egg	0	0	0	0	516	1175	207	12	0	0	0	0	1910
	Larvae	0	0	0	0	0	1750	558	49	27	0	0	0	2384
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	6	1	0	0	0	0	7
Fourbeard rockling	Egg	3	3	4254	2794	1283	834	414	12	0	0	0	0	9596
	Larvae	0	0	0	174	1255	578	0	0	0	0	0	0	2007
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	187	74	305	170	0	0	0	736
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	8	120	37	0	0	0	0	166
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	2	1	0	0	0	0	0	0	0	0	0	0	3
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	11	5	0	0	0	0	0	16
Hogchoker	Egg	0	0	0	0	0	0	32	0	0	0	0	0	32
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	3	3	0	0	0	0	0	0	0	0	0	0	6
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	1	6	1	0	0	0	0	8
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	8	5	0	0	0	13
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	39	35	13	6	0	0	0	0	0	0	0	0	92
Scup	Egg	0	0	0	0	0	1099	211	0	0	0	0	0	1310
	Larvae	0	0	0	0	0	1308	560	6	0	0	0	0	1874
Searobin	Egg	0	0	0	0	109	2161	823	194	97	0	0	0	3383
	Larvae	0	0	0	0	0	819	58	582	323	0	0	0	1783
Smallmouth flounder	Egg	0	0	0	0	0	0	0	391	217	0	0	0	608
	Larvae	0	0	0	0	0	0	2	1376	764	0	0	0	2141
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	94	52	0	0	0	146
Tautog	Egg	0	0	0	0	1108	3113	623	15	0	0	0	0	4857
	Larvae	0	0	0	0	79	2702	571	0	0	0	0	0	3353
Unidentified	Egg	0	0	0	0	0	0	0	8	5	0	0	0	13
	Larvae	0	0	0	0	0	2	9	8	5	0	0	0	23
Weakfish	Egg	0	0	0	0	0	592	114	0	0	0	0	0	706
	Larvae	0	0	0	0	0	583	337	21	11	0	0	0	952
Windowpane	Egg	0	0	13	0	2119	641	48	6	0	0	0	0	2827
	Larvae	0	0	0	0	405	443	24	8	5	0	0	0	885
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	126	0	279	13	1	0	0	0	0	0	420
Yellowtail flounder	Egg	0	0	6	0	0	0	0	0	0	0	0	0	6
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Egg	2.9	2.6	4,272.8	2,793.8	7,488.9	13,204.2	3,065.9	1,924.7	1,089.5	163.9	158.6	163.9	34,331.9
	Larvae	264.7	241.2	371.8	239.6	2,031.0	19,264.0	11,481.0	15,732.2	9,337.4	1,381.5	128.8	354.8	60,828.1
	Eggs + Larvae	267.6	243.8	4,644.6	3,033.4	9,519.9	32,468.2	14,546.9	17,656.9	10,426.9	1,545.4	287.4	518.7	95,160.0

Table 2. Monthly and annual total estimated number (in thousands) of fish eggs and larvae potentially entrained by the Broadwater FSRU under a 25% reduction in LNGC water use from baseline average flow (million gallons per day, MGD).

Flow Regime LNGC 25%, MGD= 22.8

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	212	193	223	57	0	0	0	0	0	0	0	212	896
Atlantic mackerel	Egg	0	0	0	0	132	0	0	0	0	0	0	0	132
	Larvae	0	0	0	0	12	35	0	97	54	0	0	0	198
Atlantic menhaden	Egg	0	0	0	0	2116	848	0	0	76	157	152	157	3505
	Larvae	0	0	0	0	0	8969	2410	9	62	127	123	127	11827
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	4	0	0	0	0	0	4
Bay anchovy	Egg	0	0	0	0	0	2522	511	1083	580	0	0	0	4697
	Larvae	0	0	0	0	0	1271	6233	11935	7171	1192	0	0	27801
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	3	83	45	0	0	0	130
Butterfish	Egg	0	0	0	0	0	59	57	146	80	0	0	0	341
	Larvae	0	0	0	0	0	92	86	515	285	0	0	0	978
Cunner	Egg	0	0	0	0	492	1122	198	11	0	0	0	0	1823
	Larvae	0	0	0	0	0	1671	532	47	26	0	0	0	2276
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	6	1	0	0	0	0	7
Fourbeard rockling	Egg	3	3	4062	2668	1225	796	395	11	0	0	0	0	9162
	Larvae	0	0	0	166	1198	552	0	0	0	0	0	0	1916
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	179	71	292	162	0	0	0	703
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	8	115	36	0	0	0	0	159
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	2	1	0	0	0	0	0	0	0	0	0	0	3
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	11	4	0	0	0	0	0	15
Hogchoker	Egg	0	0	0	0	0	0	30	0	0	0	0	0	30
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	3	3	0	0	0	0	0	0	0	0	0	0	5
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	1	5	1	0	0	0	0	7
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	8	4	0	0	0	12
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	37	34	12	5	0	0	0	0	0	0	0	0	88
Scup	Egg	0	0	0	0	0	1049	202	0	0	0	0	0	1251
	Larvae	0	0	0	0	0	1249	535	5	0	0	0	0	1789
Searobin	Egg	0	0	0	0	104	2063	786	185	93	0	0	0	3230
	Larvae	0	0	0	0	0	782	56	556	309	0	0	0	1702
Smallmouth flounder	Egg	0	0	0	0	0	0	0	373	207	0	0	0	580
	Larvae	0	0	0	0	0	0	2	1314	729	0	0	0	2045
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	89	50	0	0	0	139
Tautog	Egg	0	0	0	0	1058	2972	595	14	0	0	0	0	4638
	Larvae	0	0	0	0	76	2580	545	0	0	0	0	0	3201
Unidentified	Egg	0	0	0	0	0	0	0	8	4	0	0	0	12
	Larvae	0	0	0	0	0	1	9	8	4	0	0	0	22
Weakfish	Egg	0	0	0	0	0	565	109	0	0	0	0	0	674
	Larvae	0	0	0	0	0	556	322	20	11	0	0	0	909
Windowpane	Egg	0	0	12	0	2024	612	46	6	0	0	0	0	2699
	Larvae	0	0	0	0	387	423	23	8	4	0	0	0	845
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	121	0	267	13	1	0	0	0	0	0	401
Yellowtail flounder	Egg	0	0	6	0	0	0	0	0	0	0	0	0	6
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Egg	2.7	2.5	4,079.5	2,667.5	7,150.2	12,607.0	2,927.2	1,837.7	1,040.2	156.5	151.5	156.5	32,779.2
	Larvae	252.7	230.3	354.9	228.8	1,939.2	18,392.8	10,961.8	15,020.7	8,915.1	1,319.0	123.0	338.7	58,077.1
	Eggs + Larvae	255.4	232.8	4,434.4	2,896.3	9,089.4	30,999.8	13,889.0	16,858.4	9,955.3	1,475.5	274.5	495.2	90,856.3

Table 3. Monthly and annual total estimated number (in thousands) of fish eggs and larvae potentially entrained by the Broadwater FSRU under a 30% reduction in LNGC water use from baseline average flow (million gallons per day, MGD).

Flow Regime LNGC 30%, MGD= 21.72

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	202	184	212	55	0	0	0	0	0	0	0	202	854
Atlantic mackerel	Egg	0	0	0	0	126	0	0	0	0	0	0	0	126
	Larvae	0	0	0	0	11	34	0	93	51	0	0	0	189
Atlantic menhaden	Egg	0	0	0	0	2016	808	0	0	72	149	144	149	3339
	Larvae	0	0	0	0	0	8544	2296	8	59	121	117	121	11267
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	4	0	0	0	0	0	4
Bay anchovy	Egg	0	0	0	0	0	2403	487	1032	553	0	0	0	4474
	Larvae	0	0	0	0	0	1211	5938	11370	6831	1136	0	0	26484
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	2	79	43	0	0	0	124
Butterfish	Egg	0	0	0	0	0	56	54	139	76	0	0	0	325
	Larvae	0	0	0	0	0	88	82	490	271	0	0	0	931
Cunner	Egg	0	0	0	0	469	1069	189	11	0	0	0	0	1737
	Larvae	0	0	0	0	0	1591	507	45	25	0	0	0	2168
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	6	1	0	0	0	0	6
Fourbeard rockling	Egg	3	2	3869	2541	1167	759	376	11	0	0	0	0	8728
	Larvae	0	0	0	158	1141	526	0	0	0	0	0	0	1825
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	170	67	278	154	0	0	0	669
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	8	109	34	0	0	0	0	151
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	1	1	0	0	0	0	0	0	0	0	0	0	3
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	10	4	0	0	0	0	0	14
Hogchoker	Egg	0	0	0	0	0	0	29	0	0	0	0	0	29
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	3	2	0	0	0	0	0	0	0	0	0	0	5
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	1	5	1	0	0	0	0	7
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	7	4	0	0	0	12
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	35	32	11	5	0	0	0	0	0	0	0	0	83
Scup	Egg	0	0	0	0	0	999	192	0	0	0	0	0	1192
	Larvae	0	0	0	0	0	1190	510	5	0	0	0	0	1704
Searobin	Egg	0	0	0	0	99	1965	748	176	88	0	0	0	3077
	Larvae	0	0	0	0	0	745	53	530	294	0	0	0	1622
Smallmouth flounder	Egg	0	0	0	0	0	0	0	355	197	0	0	0	553
	Larvae	0	0	0	0	0	0	2	1251	695	0	0	0	1948
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	85	47	0	0	0	132
Tautog	Egg	0	0	0	0	1007	2831	566	13	0	0	0	0	4418
	Larvae	0	0	0	0	72	2458	519	0	0	0	0	0	3049
Unidentified	Egg	0	0	0	0	0	0	0	7	4	0	0	0	12
	Larvae	0	0	0	0	0	1	8	7	4	0	0	0	21
Weakfish	Egg	0	0	0	0	0	538	103	0	0	0	0	0	642
	Larvae	0	0	0	0	0	530	307	19	10	0	0	0	866
Windowpane	Egg	0	0	11	0	1928	583	44	6	0	0	0	0	2571
	Larvae	0	0	0	0	369	403	22	7	4	0	0	0	805
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	115	0	254	12	1	0	0	0	0	0	382
Yellowtail flounder	Egg	0	0	6	0	0	0	0	0	0	0	0	0	6
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Egg	2.6	2.4	3,886.3	2,541.1	6,811.5	12,009.8	2,788.6	1,750.6	991.0	149.1	144.3	149.1	31,226.5
	Larvae	240.7	219.4	338.1	217.9	1,847.3	17,521.6	10,442.5	14,309.2	8,492.8	1,256.6	117.2	322.7	55,326.1
	Eggs + Larvae	243.3	221.8	4,224.4	2,759.0	8,658.8	29,531.4	13,231.1	16,059.8	9,483.8	1,405.7	261.5	471.8	86,552.6

Table 4. Monthly and annual total estimated number (in thousands) of fish eggs and larvae potentially entrained by the Broadwater FSRU under a 15% reduction in LNGC water use and 20% reduction in FSRU water use from baseline average flow (million gallons per day, MGD).

Flow Regime FSRU 15%, LNGC 20%, MGD= 22.89

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	213	194	223	58	0	0	0	0	0	0	0	213	900
Atlantic mackerel	Egg	0	0	0	0	132	0	0	0	0	0	0	0	132
	Larvae	0	0	0	0	12	36	0	98	54	0	0	0	199
Atlantic menhaden	Egg	0	0	0	0	2125	852	0	0	76	157	152	157	3519
	Larvae	0	0	0	0	0	9005	2420	9	62	128	124	128	11873
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	4	0	0	0	0	0	4
Bay anchovy	Egg	0	0	0	0	0	2532	513	1088	583	0	0	0	4715
	Larvae	0	0	0	0	0	1276	6258	11982	7199	1197	0	0	27911
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	3	83	46	0	0	0	131
Butterfish	Egg	0	0	0	0	0	59	57	146	80	0	0	0	343
	Larvae	0	0	0	0	0	93	86	517	286	0	0	0	982
Cunner	Egg	0	0	0	0	494	1126	199	11	0	0	0	0	1831
	Larvae	0	0	0	0	0	1677	535	47	26	0	0	0	2285
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	6	1	0	0	0	0	7
Fourbeard rockling	Egg	3	3	4078	2678	1230	799	397	11	0	0	0	0	9198
	Larvae	0	0	0	167	1203	554	0	0	0	0	0	0	1924
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	179	71	293	163	0	0	0	706
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	8	115	36	0	0	0	0	159
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	2	1	0	0	0	0	0	0	0	0	0	0	3
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	11	4	0	0	0	0	0	15
Hogchoker	Egg	0	0	0	0	0	0	30	0	0	0	0	0	30
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	3	3	0	0	0	0	0	0	0	0	0	0	5
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	1	5	1	0	0	0	0	7
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	8	4	0	0	0	12
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	37	34	12	5	0	0	0	0	0	0	0	0	88
Scup	Egg	0	0	0	0	0	1053	202	0	0	0	0	0	1256
	Larvae	0	0	0	0	0	1254	537	5	0	0	0	0	1796
Searobin	Egg	0	0	0	0	104	2071	789	186	93	0	0	0	3243
	Larvae	0	0	0	0	0	786	56	558	310	0	0	0	1709
Smallmouth flounder	Egg	0	0	0	0	0	0	0	374	208	0	0	0	582
	Larvae	0	0	0	0	0	0	2	1319	732	0	0	0	2053
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	90	50	0	0	0	140
Tautog	Egg	0	0	0	0	1062	2983	597	14	0	0	0	0	4656
	Larvae	0	0	0	0	76	2590	547	0	0	0	0	0	3214
Unidentified	Egg	0	0	0	0	0	0	0	8	4	0	0	0	12
	Larvae	0	0	0	0	0	2	9	8	4	0	0	0	22
Weakfish	Egg	0	0	0	0	0	567	109	0	0	0	0	0	676
	Larvae	0	0	0	0	0	558	323	20	11	0	0	0	913
Windowpane	Egg	0	0	12	0	2032	614	46	6	0	0	0	0	2710
	Larvae	0	0	0	0	389	425	23	8	4	0	0	0	848
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	121	0	268	13	1	0	0	0	0	0	402
Yellowtail flounder	Egg	0	0	6	0	0	0	0	0	0	0	0	0	6
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Egg	2.7	2.5	4,095.6	2,678.0	7,178.5	12,656.8	2,938.8	1,844.9	1,044.3	157.1	152.1	157.1	32,908.6
	Larvae	253.7	231.2	356.4	229.7	1,946.8	18,465.4	11,005.1	15,080.0	8,950.3	1,324.2	123.5	340.1	58,306.3
	Eggs + Larvae	256.4	233.7	4,452.0	2,907.7	9,125.3	31,122.2	13,943.9	16,924.9	9,994.6	1,481.3	275.6	497.2	91,214.9

Table 5. Monthly and annual total estimated number (in thousands) of fish eggs and larvae potentially entrained by the Broadwater FSRU under a 30% reduction in LNGC water use and 20% reduction in FSRU water use from baseline average flow (million gallons per day, MGD).

Flow Regime FSRU 20%, LNGC 20%, MGD= 22.56

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	209	191	220	57	0	0	0	0	0	0	0	209	887
Atlantic mackerel	Egg	0	0	0	0	130	0	0	0	0	0	0	0	130
	Larvae	0	0	0	0	12	35	0	96	53	0	0	0	196
Atlantic menhaden	Egg	0	0	0	0	2094	839	0	0	75	155	150	155	3468
	Larvae	0	0	0	0	0	8875	2385	9	61	126	122	126	11702
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	4	0	0	0	0	0	4
Bay anchovy	Egg	0	0	0	0	0	2496	506	1072	574	0	0	0	4647
	Larvae	0	0	0	0	0	1257	6167	11809	7095	1179	0	0	27509
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	3	82	45	0	0	0	129
Butterfish	Egg	0	0	0	0	0	58	56	144	79	0	0	0	338
	Larvae	0	0	0	0	0	91	85	509	282	0	0	0	968
Cunner	Egg	0	0	0	0	487	1110	196	11	0	0	0	0	1804
	Larvae	0	0	0	0	0	1653	527	47	26	0	0	0	2252
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	6	1	0	0	0	0	7
Fourbeard rockling	Egg	3	3	4019	2639	1212	788	391	11	0	0	0	0	9065
	Larvae	0	0	0	164	1186	546	0	0	0	0	0	0	1896
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	177	70	289	160	0	0	0	695
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	8	114	35	0	0	0	0	157
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	2	1	0	0	0	0	0	0	0	0	0	0	3
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	11	4	0	0	0	0	0	15
Hogchoker	Egg	0	0	0	0	0	0	30	0	0	0	0	0	30
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	3	3	0	0	0	0	0	0	0	0	0	0	5
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	1	5	1	0	0	0	0	7
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	8	4	0	0	0	12
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	37	33	12	5	0	0	0	0	0	0	0	0	87
Scup	Egg	0	0	0	0	0	1038	199	0	0	0	0	0	1238
	Larvae	0	0	0	0	0	1236	529	5	0	0	0	0	1770
Searobin	Egg	0	0	0	0	103	2041	777	183	92	0	0	0	3196
	Larvae	0	0	0	0	0	774	55	550	305	0	0	0	1685
Smallmouth flounder	Egg	0	0	0	0	0	0	0	369	205	0	0	0	574
	Larvae	0	0	0	0	0	0	2	1300	722	0	0	0	2023
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	88	49	0	0	0	138
Tautog	Egg	0	0	0	0	1046	2940	588	14	0	0	0	0	4589
	Larvae	0	0	0	0	75	2553	539	0	0	0	0	0	3167
Unidentified	Egg	0	0	0	0	0	0	0	8	4	0	0	0	12
	Larvae	0	0	0	0	0	1	9	8	4	0	0	0	22
Weakfish	Egg	0	0	0	0	0	559	107	0	0	0	0	0	667
	Larvae	0	0	0	0	0	550	319	20	11	0	0	0	899
Windowpane	Egg	0	0	12	0	2002	605	46	6	0	0	0	0	2671
	Larvae	0	0	0	0	383	419	23	8	4	0	0	0	836
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	119	0	264	12	1	0	0	0	0	0	397
Yellowtail flounder	Egg	0	0	6	0	0	0	0	0	0	0	0	0	6
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Egg	2.7	2.5	4,036.6	2,639.4	7,075.0	12,474.3	2,896.4	1,818.3	1,029.3	154.9	149.9	154.9	32,434.1
	Larvae	250.1	227.9	351.2	226.4	1,918.8	18,199.2	10,846.4	14,862.6	8,821.3	1,305.2	121.7	335.2	57,465.7
	Eggs + Larvae	252.8	230.4	4,387.8	2,865.8	8,993.8	30,673.5	13,742.8	16,680.9	9,850.6	1,460.1	271.6	490.1	89,899.8

Table 6. Monthly and annual total estimated number (in thousands) of fish eggs and larvae potentially entrained by the Broadwater FSRU under a 30% reduction in LNGC water use and 20% reduction in FSRU water use from baseline average flow (million gallons per day, MGD).

Flow Regime FSRU 20%, LNGC 30%, MGD= 20.4

Species	Lifestage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	189	173	199	51	0	0	0	0	0	0	0	189	802
Atlantic mackerel	Egg	0	0	0	0	118	0	0	0	0	0	0	0	118
	Larvae	0	0	0	0	11	32	0	87	48	0	0	0	177
Atlantic menhaden	Egg	0	0	0	0	1894	759	0	0	68	140	136	140	3136
	Larvae	0	0	0	0	0	8025	2157	8	55	114	110	114	10582
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	3	0	0	0	0	0	3
Bay anchovy	Egg	0	0	0	0	0	2257	457	969	519	0	0	0	4202
	Larvae	0	0	0	0	0	1137	5577	10679	6416	1067	0	0	24875
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	2	74	41	0	0	0	117
Butterfish	Egg	0	0	0	0	0	53	51	130	71	0	0	0	305
	Larvae	0	0	0	0	0	83	77	460	255	0	0	0	875
Cunner	Egg	0	0	0	0	441	1004	177	10	0	0	0	0	1631
	Larvae	0	0	0	0	0	1495	476	42	23	0	0	0	2036
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	5	1	0	0	0	0	6
Fourbeard rockling	Egg	2	2	3634	2387	1096	712	354	10	0	0	0	0	8197
	Larvae	0	0	0	149	1072	494	0	0	0	0	0	0	1715
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	160	63	261	145	0	0	0	629
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	7	103	32	0	0	0	0	142
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	1	1	0	0	0	0	0	0	0	0	0	0	3
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	10	4	0	0	0	0	0	14
Hogchoker	Egg	0	0	0	0	0	0	27	0	0	0	0	0	27
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	2	2	0	0	0	0	0	0	0	0	0	0	5
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	1	5	1	0	0	0	0	7
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	7	4	0	0	0	11
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	33	30	11	5	0	0	0	0	0	0	0	0	78
Scup	Egg	0	0	0	0	0	939	180	0	0	0	0	0	1119
	Larvae	0	0	0	0	0	1117	479	5	0	0	0	0	1601
Searobin	Egg	0	0	0	0	93	1846	703	165	83	0	0	0	2890
	Larvae	0	0	0	0	0	700	50	497	276	0	0	0	1523
Smallmouth flounder	Egg	0	0	0	0	0	0	0	334	185	0	0	0	519
	Larvae	0	0	0	0	0	0	2	1175	653	0	0	0	1829
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	80	44	0	0	0	124
Tautog	Egg	0	0	0	0	946	2659	532	13	0	0	0	0	4150
	Larvae	0	0	0	0	68	2308	488	0	0	0	0	0	2864
Unidentified	Egg	0	0	0	0	0	0	0	7	4	0	0	0	11
	Larvae	0	0	0	0	0	1	8	7	4	0	0	0	20
Weakfish	Egg	0	0	0	0	0	506	97	0	0	0	0	0	603
	Larvae	0	0	0	0	0	498	288	18	10	0	0	0	813
Windowpane	Egg	0	0	11	0	1811	547	41	5	0	0	0	0	2415
	Larvae	0	0	0	0	346	379	20	7	4	0	0	0	756
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	108	0	238	11	1	0	0	0	0	0	359
Yellowtail flounder	Egg	0	0	5	0	0	0	0	0	0	0	0	0	5
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Egg	2.4	2.2	3,650.1	2,386.7	6,397.6	11,280.0	2,619.1	1,644.3	930.7	140.0	135.5	140.0	29,328.7
	Larvae	226.1	206.1	317.6	204.7	1,735.0	16,456.7	9,807.9	13,439.6	7,976.7	1,180.2	110.1	303.1	51,963.7
	Eggs + Larvae	228.5	208.3	3,967.7	2,591.4	8,132.6	27,736.7	12,427.0	15,083.9	8,907.4	1,320.2	245.6	443.1	81,292.4

Table 7. Summmary of Potential Flow Reduction Scenarios

		Number of fish eggs and larvae combined (in thousands)												
Flow Regime	MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Baseline	28	316	288	5,485	3,582	11,242	38,342	17,179	20,851	12,313	1,825	339	613	112,375
LNGC 20%	24	268	244	4,645	3,033	9,520	32,468	14,547	17,657	10,427	1,545	287	519	95,160
LNGC 25%	23	255	233	4,434	2,896	9,089	31,000	13,889	16,858	9,955	1,476	275	495	90,856
LNGC 30%	22	243	222	4,224	2,759	8,659	29,531	13,231	16,060	9,484	1,406	262	472	86,553
FSRU 15%, LNGC 20%	23	256	234	4,452	2,908	9,125	31,122	13,944	16,925	9,995	1,481	276	497	91,215
FSRU 20%, LNGC 20%	23	253	230	4,388	2,866	8,994	30,674	13,743	16,681	9,851	1,460	272	490	89,900
FSRU 20%, LNGC 30%	20	229	208	3,968	2,591	8,133	27,737	12,427	15,084	8,907	1,320	246	443	81,292

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Attachment 2

Ichthyoplankton Implants - Flow Reduction Adult Equivalents

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Table 1. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under a 20% reduction in LNGC water use from baseline average flow (million gallons per day, MGD).

Flow Regime LNGC 20%, MGD= 23.88

Species & Life Stage		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	178	162	187	48	0	0	0	0	0	0	0	178	755
	Total	178	162	187	48	0	0	0	0	0	0	0	178	755
Atlantic mackerel	Egg	0	0	0	0	<1	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
	Total	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
Atlantic menhaden	Egg	0	0	0	0	25	10	0	0	<1	2	2	2	41
	Larvae	0	0	0	0	0	1829	492	2	13	26	25	26	2412
	Total	0	0	0	0	25	1839	492	2	13	28	27	28	2453
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	12	0	0	0	0	0	12
	Total	0	0	0	0	0	0	12	0	0	0	0	0	12
Bay anchovy	Egg	0	0	0	0	0	166	34	71	38	0	0	0	309
	Larvae	0	0	0	0	0	322	1579	3023	1816	302	0	0	7042
	Total	0	0	0	0	0	488	1612	3094	1854	302	0	0	7350
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	<1	21	12	0	0	0	33
	Total	0	0	0	0	0	0	<1	21	12	0	0	0	33
Butterfish	Egg	0	0	0	0	0	1	1	3	1	0	0	0	6
	Larvae	0	0	0	0	0	9	8	51	28	0	0	0	96
	Total	0	0	0	0	0	10	10	53	29	0	0	0	102
Cunner	Egg	0	0	0	0	78	177	31	2	0	0	0	0	288
	Larvae	0	0	0	0	0	1384	441	39	21	0	0	0	1885
	Total	0	0	0	0	78	1561	472	41	21	0	0	0	2173
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	1	<1	0	0	0	0	2
	Total	0	0	0	0	0	0	1	<1	0	0	0	0	2
Fourbeard rockling	Egg	<1	<1	36	23	11	7	3	<1	0	0	0	0	80
	Larvae	0	0	0	7	51	23	0	0	0	0	0	0	82
	Total	<1	<1	36	31	62	30	3	<1	0	0	0	0	162
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	2	<1	0	0	0	4
	Total	0	0	0	0	0	<1	<1	2	<1	0	0	0	4
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	28	397	124	0	0	0	0	548
	Total	0	0	0	0	0	28	397	124	0	0	0	0	548
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	5	0	0	0	0	0	0	0	0	0	0	10
	Total	5	5	0	0	0	0	0	0	0	0	0	0	10
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
Hogchoker	Egg	0	0	0	0	0	0	<1	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	<1	0	0	0	0	0	<1
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	5	0	0	0	0	0	0	0	0	0	0	10
	Total	5	5	0	0	0	0	0	0	0	0	0	0	10
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	557	2264	217	0	0	0	0	3038
	Total	0	0	0	0	0	557	2264	217	0	0	0	0	3038
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	3	2	0	0	0	5
	Total	0	0	0	0	0	0	0	3	2	0	0	0	5
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	<1	<1	<1	<1	0	0	0	0	0	0	0	0	2
	Total	<1	<1	<1	<1	0	0	0	0	0	0	0	0	2
Scup	Egg	0	0	0	0	0	106	20	<1	0	0	0	0	127
	Larvae	0	0	0	0	0	648	277	3	0	0	0	0	928
	Total	0	0	0	0	0	754	298	3	0	0	0	0	1055
Searobin	Egg	0	0	0	0	244	4845	1845	434	218	0	0	0	7587
	Larvae	0	0	0	0	0	10809	768	7679	4263	0	0	0	23519
	Total	0	0	0	0	244	15654	2614	8113	4481	0	0	0	31106
Smallmouth flounder	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	0	<1	7	4	0	0	0	11
	Total	0	0	0	0	0	0	<1	7	4	0	0	0	11
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	36	20	0	0	0	56
	Total	0	0	0	0	0	0	0	36	20	0	0	0	56
Tautog	Egg	0	0	0	0	<1	<1	<1	<1	0	0	0	0	1
	Larvae	0	0	0	0	2	75	16	0	0	0	0	0	93
	Total	0	0	0	0	2	76	16	<1	0	0	0	0	94
Unidentified	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
	Total	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
Weakfish	Egg	0	0	0	0	0	4	<1	<1	0	0	0	0	4
	Larvae	0	0	0	0	0	14	8	<1	<1	0	0	0	22
	Total	0	0	0	0	0	17	9	<1	<1	0	0	0	27
Windowpane	Egg	0	0	<1	0	2	<1	<1	<1	0	0	0	0	3
	Larvae	0	0	0	0	2	2	<1	<1	<1	0	0	0	4
	Total	0	0	<1	0	4	3	<1	<1	<1	0	0	0	7
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	16	0	36	2	<1	0	0	0	0	0	55
	Total	0	0	16	0	36	2	<1	0	0	0	0	0	55
Yellowtail flounder	Egg	0	0	<1	0	0	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	<1	0	0	0	0	0	0	0	0	0	<1
Total	Egg	<1	<1	36	23	360	5317	1937	511	259	2	2	2	8448
	Larvae	189	173	204	55	92	15703	6266	11207	6180	328	25	204	40627
	Total	189	173	240	79	452	21021	8202	11718	6439	330	27	206	49075

Table 2. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under a 25% reduction in LNGC water use from baseline average flow (million gallons per day, MGD).

Flow Regime LNGC 25%, MGD= 22.8

Species & Life Stage		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	170	155	179	46	0	0	0	0	0	0	0	170	721
	Total	170	155	179	46	0	0	0	0	0	0	0	170	721
Atlantic mackerel	Egg	0	0	0	0	<1	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
	Total	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
Atlantic menhaden	Egg	0	0	0	0	24	9	0	0	<1	2	2	2	39
	Larvae	0	0	0	0	0	1747	469	2	12	25	24	25	2303
	Total	0	0	0	0	24	1756	469	2	13	26	26	26	2342
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	11	0	0	0	0	0	11
	Total	0	0	0	0	0	0	11	0	0	0	0	0	11
Bay anchovy	Egg	0	0	0	0	0	158	32	68	36	0	0	0	295
	Larvae	0	0	0	0	0	307	1507	2886	1734	288	0	0	6723
	Total	0	0	0	0	0	465	1539	2954	1770	288	0	0	7018
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	<1	20	11	0	0	0	32
	Total	0	0	0	0	0	0	<1	20	11	0	0	0	32
Butterfish	Egg	0	0	0	0	0	1	1	3	1	0	0	0	6
	Larvae	0	0	0	0	0	9	8	48	27	0	0	0	92
	Total	0	0	0	0	0	10	9	51	28	0	0	0	98
Cunner	Egg	0	0	0	0	74	169	30	2	0	0	0	0	275
	Larvae	0	0	0	0	0	1321	421	37	20	0	0	0	1800
	Total	0	0	0	0	74	1490	451	39	20	0	0	0	2075
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	1	<1	0	0	0	0	2
	Total	0	0	0	0	0	0	1	<1	0	0	0	0	2
Fourbeard rockling	Egg	<1	<1	34	22	10	7	3	<1	0	0	0	0	77
	Larvae	0	0	0	7	49	22	0	0	0	0	0	0	78
	Total	<1	<1	34	29	59	29	3	<1	0	0	0	0	155
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
	Total	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	26	379	118	0	0	0	0	524
	Total	0	0	0	0	0	26	379	118	0	0	0	0	524
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	4	0	0	0	0	0	0	0	0	0	0	9
	Total	5	4	0	0	0	0	0	0	0	0	0	0	9
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
Hogchoker	Egg	0	0	0	0	0	0	<1	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	<1	0	0	0	0	0	<1
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	5	0	0	0	0	0	0	0	0	0	0	10
	Total	5	5	0	0	0	0	0	0	0	0	0	0	10
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	532	2162	207	0	0	0	0	2901
	Total	0	0	0	0	0	532	2162	207	0	0	0	0	2901
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	3	2	0	0	0	5
	Total	0	0	0	0	0	0	0	3	2	0	0	0	5
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
	Total	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
Scup	Egg	0	0	0	0	0	101	19	<1	0	0	0	0	121
	Larvae	0	0	0	0	0	619	265	3	0	0	0	0	886
	Total	0	0	0	0	0	720	284	3	0	0	0	0	1007
Searobin	Egg	0	0	0	0	233	4626	1762	415	208	0	0	0	7244
	Larvae	0	0	0	0	0	10320	734	7332	4070	0	0	0	22455
	Total	0	0	0	0	233	14946	2495	7746	4278	0	0	0	29699
Smallmouth flounder	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	0	<1	6	4	0	0	0	10
	Total	0	0	0	0	0	0	<1	7	4	0	0	0	11
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	34	19	0	0	0	53
	Total	0	0	0	0	0	0	0	34	19	0	0	0	53
Tautog	Egg	0	0	0	0	<1	<1	<1	<1	0	0	0	0	1
	Larvae	0	0	0	0	2	72	15	0	0	0	0	0	89
	Total	0	0	0	0	2	72	15	<1	0	0	0	0	90
Unidentified	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
	Total	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
Weakfish	Egg	0	0	0	0	0	3	<1	<1	0	0	0	0	4
	Larvae	0	0	0	0	0	13	8	<1	<1	0	0	0	21
	Total	0	0	0	0	0	17	8	<1	<1	0	0	0	25
Windowpane	Egg	0	0	<1	0	2	<1	<1	<1	0	0	0	0	3
	Larvae	0	0	0	0	2	2	<1	<1	<1	0	0	0	4
	Total	0	0	<1	0	4	3	<1	<1	<1	0	0	0	7
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	16	0	35	2	<1	0	0	0	0	0	52
	Total	0	0	16	0	35	2	<1	0	0	0	0	0	52
Yellowtail flounder	Egg	0	0	<1	0	0	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	<1	0	0	0	0	0	0	0	0	0	<1
Total	Egg	<1	<1	34	22	344	5077	1849	488	247	2	2	2	8066
	Larvae	181	165	195	53	88	14993	5983	10700	5900	313	24	195	38790
	Total	181	165	229	75	431	20070	7831	11188	6147	315	26	197	46855

Table 3. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under a 30% reduction in LNGC water use from baseline average flow (million gallons per day, MGD).

Flow Regime LNGC 30%, MGD= 21.72

Species & Life Stage		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	162	148	171	44	0	0	0	0	0	0	0	162	687
	Total	162	148	171	44	0	0	0	0	0	0	0	162	687
Atlantic mackerel	Egg	0	0	0	0	<1	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
	Total	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
Atlantic menhaden	Egg	0	0	0	0	22	9	0	0	<1	2	2	2	37
	Larvae	0	0	0	0	0	1664	447	2	11	24	23	24	2194
	Total	0	0	0	0	22	1673	447	2	12	25	24	25	2231
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	11	0	0	0	0	0	11
	Total	0	0	0	0	0	0	11	0	0	0	0	0	11
Bay anchovy	Egg	0	0	0	0	0	151	31	65	35	0	0	0	281
	Larvae	0	0	0	0	0	293	1436	2749	1652	275	0	0	6405
	Total	0	0	0	0	0	443	1466	2814	1687	275	0	0	6685
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	<1	19	11	0	0	0	30
	Total	0	0	0	0	0	0	<1	19	11	0	0	0	30
Butterfish	Egg	0	0	0	0	0	<1	<1	2	1	0	0	0	6
	Larvae	0	0	0	0	0	8	8	46	25	0	0	0	87
	Total	0	0	0	0	0	9	9	48	27	0	0	0	93
Cunner	Egg	0	0	0	0	71	161	28	2	0	0	0	0	262
	Larvae	0	0	0	0	0	1259	401	35	20	0	0	0	1715
	Total	0	0	0	0	71	1420	430	37	20	0	0	0	1977
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	1	<1	0	0	0	0	2
	Total	0	0	0	0	0	0	1	<1	0	0	0	0	2
Fourbeard rockling	Egg	<1	<1	32	21	10	6	3	<1	0	0	0	0	73
	Larvae	0	0	0	6	46	21	0	0	0	0	0	0	74
	Total	<1	<1	32	28	56	28	3	<1	0	0	0	0	147
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
	Total	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	25	361	112	0	0	0	0	499
	Total	0	0	0	0	0	25	361	112	0	0	0	0	499
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	4	0	0	0	0	0	0	0	0	0	0	9
	Total	5	4	0	0	0	0	0	0	0	0	0	0	9
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
Hogchoker	Egg	0	0	0	0	0	0	<1	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	<1	0	0	0	0	0	<1
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	4	0	0	0	0	0	0	0	0	0	0	9
	Total	5	4	0	0	0	0	0	0	0	0	0	0	9
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	507	2059	197	0	0	0	0	2763
	Total	0	0	0	0	0	507	2059	197	0	0	0	0	2763
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	3	2	0	0	0	4
	Total	0	0	0	0	0	0	0	3	2	0	0	0	4
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
	Total	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
Scup	Egg	0	0	0	0	0	97	19	<1	0	0	0	0	115
	Larvae	0	0	0	0	0	589	252	3	0	0	0	0	844
	Total	0	0	0	0	0	686	271	3	0	0	0	0	959
Searobin	Egg	0	0	0	0	222	4407	1678	395	198	0	0	0	6901
	Larvae	0	0	0	0	0	9831	699	6984	3877	0	0	0	21391
	Total	0	0	0	0	222	14238	2377	7379	4075	0	0	0	28292
Smallmouth flounder	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	0	<1	6	3	0	0	0	10
	Total	0	0	0	0	0	0	<1	7	4	0	0	0	10
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	33	18	0	0	0	51
	Total	0	0	0	0	0	0	0	33	18	0	0	0	51
Tautog	Egg	0	0	0	0	<1	<1	<1	<1	0	0	0	0	1
	Larvae	0	0	0	0	2	68	14	0	0	0	0	0	85
	Total	0	0	0	0	2	69	15	<1	0	0	0	0	86
Unidentified	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
	Total	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
Weakfish	Egg	0	0	0	0	0	3	<1	<1	0	0	0	0	4
	Larvae	0	0	0	0	0	12	7	<1	<1	0	0	0	20
	Total	0	0	0	0	0	16	8	<1	<1	0	0	0	24
Windowpane	Egg	0	0	<1	0	2	<1	<1	<1	0	0	0	0	3
	Larvae	0	0	0	0	2	2	<1	<1	<1	0	0	0	4
	Total	0	0	<1	0	4	3	<1	<1	<1	0	0	0	7
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	15	0	33	2	<1	0	0	0	0	0	50
	Total	0	0	15	0	33	2	<1	0	0	0	0	0	50
Yellowtail flounder	Egg	0	0	<1	0	0	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	<1	0	0	0	0	0	0	0	0	0	<1
Total	Egg	<1	<1	32	21	327	4837	1761	464	235	2	2	2	7684
	Larvae	172	157	186	50	83	14283	5699	10194	5621	298	23	186	36952
	Total	172	157	218	72	411	19119	7461	10658	5856	300	24	187	44636

Table 4. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under a 20% reduction in LNGC water use and a 15% reduction in FSRU water use from baseline average flow (million gallons per day, MGD).

Flow Regime FSRU 15%, LNGC 20%, MGD= 22.89

Species & Life Stage		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	171	156	180	46	0	0	0	0	0	0	0	171	724
	Total	171	156	180	46	0	0	0	0	0	0	0	171	724
Atlantic mackerel	Egg	0	0	0	0	<1	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
	Total	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
Atlantic menhaden	Egg	0	0	0	0	24	9	0	0	<1	2	2	2	39
	Larvae	0	0	0	0	0	1754	471	2	12	25	24	25	2312
	Total	0	0	0	0	24	1763	471	2	13	27	26	27	2351
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	11	0	0	0	0	0	11
	Total	0	0	0	0	0	0	11	0	0	0	0	0	11
Bay anchovy	Egg	0	0	0	0	0	159	32	68	37	0	0	0	296
	Larvae	0	0	0	0	0	309	1513	2898	1741	289	0	0	6750
	Total	0	0	0	0	0	467	1545	2966	1777	289	0	0	7045
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	<1	20	11	0	0	0	32
	Total	0	0	0	0	0	0	<1	20	11	0	0	0	32
Butterfish	Egg	0	0	0	0	0	1	1	3	1	0	0	0	6
	Larvae	0	0	0	0	0	9	8	48	27	0	0	0	92
	Total	0	0	0	0	0	10	9	51	28	0	0	0	98
Cunner	Egg	0	0	0	0	75	170	30	2	0	0	0	0	276
	Larvae	0	0	0	0	0	1326	423	37	21	0	0	0	1807
	Total	0	0	0	0	75	1496	453	39	21	0	0	0	2083
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	1	<1	0	0	0	0	2
	Total	0	0	0	0	0	0	1	<1	0	0	0	0	2
Fourbeard rockling	Egg	<1	<1	34	22	10	7	3	<1	0	0	0	0	77
	Larvae	0	0	0	7	49	23	0	0	0	0	0	0	78
	Total	<1	<1	34	29	59	29	3	<1	0	0	0	0	155
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
	Total	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	26	381	118	0	0	0	0	526
	Total	0	0	0	0	0	26	381	118	0	0	0	0	526
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	4	0	0	0	0	0	0	0	0	0	0	9
	Total	5	4	0	0	0	0	0	0	0	0	0	0	9
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
Hogchoker	Egg	0	0	0	0	0	0	<1	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	<1	0	0	0	0	0	<1
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	5	0	0	0	0	0	0	0	0	0	0	10
	Total	5	5	0	0	0	0	0	0	0	0	0	0	10
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	534	2170	208	0	0	0	0	2912
	Total	0	0	0	0	0	534	2170	208	0	0	0	0	2912
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	3	2	0	0	0	5
	Total	0	0	0	0	0	0	0	3	2	0	0	0	5
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
	Total	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
Scup	Egg	0	0	0	0	0	102	20	<1	0	0	0	0	121
	Larvae	0	0	0	0	0	621	266	3	0	0	0	0	890
	Total	0	0	0	0	0	723	286	3	0	0	0	0	1011
Searobin	Egg	0	0	0	0	234	4645	1769	416	209	0	0	0	7272
	Larvae	0	0	0	0	0	10361	737	7361	4086	0	0	0	22544
	Total	0	0	0	0	234	15005	2505	7777	4295	0	0	0	29816
Smallmouth flounder	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	0	<1	7	4	0	0	0	10
	Total	0	0	0	0	0	0	<1	7	4	0	0	0	11
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	34	19	0	0	0	53
	Total	0	0	0	0	0	0	0	34	19	0	0	0	53
Tautog	Egg	0	0	0	0	<1	<1	<1	<1	0	0	0	0	1
	Larvae	0	0	0	0	2	72	15	0	0	0	0	0	89
	Total	0	0	0	0	2	73	15	<1	0	0	0	0	91
Unidentified	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
	Total	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
Weakfish	Egg	0	0	0	0	0	3	<1	<1	0	0	0	0	4
	Larvae	0	0	0	0	0	13	8	<1	<1	0	0	0	21
	Total	0	0	0	0	0	17	8	<1	<1	0	0	0	26
Windowpane	Egg	0	0	<1	0	2	<1	<1	<1	0	0	0	0	3
	Larvae	0	0	0	0	2	2	<1	<1	<1	0	0	0	4
	Total	0	0	<1	0	4	3	<1	<1	<1	0	0	0	7
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	16	0	35	2	<1	0	0	0	0	0	53
	Total	0	0	16	0	35	2	<1	0	0	0	0	0	53
Yellowtail flounder	Egg	0	0	<1	0	0	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	<1	0	0	0	0	0	0	0	0	0	<1
Total	Egg	<1	<1	34	22	345	5097	1856	489	248	2	2	2	8098
	Larvae	182	165	196	53	88	15052	6006	10743	5924	314	24	196	38943
	Total	182	165	230	76	433	20149	7862	11232	6172	316	26	198	47040

Table 5. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under a 20% reduction in LNGC water use and a 20% reduction in FSRU water use from baseline average flow (million gallons per day, MGD).

Flow Regime FSRU 20%, LNGC 20%, MGD= 22.56

Species & Life Stage		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	168	154	177	46	0	0	0	0	0	0	0	168	713
	Total	168	154	177	46	0	0	0	0	0	0	0	168	713
Atlantic mackerel	Egg	0	0	0	0	<1	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
	Total	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
Atlantic menhaden	Egg	0	0	0	0	23	9	0	0	<1	2	2	2	39
	Larvae	0	0	0	0	0	1728	464	2	12	24	24	24	2279
	Total	0	0	0	0	23	1738	464	2	13	26	25	26	2317
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	11	0	0	0	0	0	11
	Total	0	0	0	0	0	0	11	0	0	0	0	0	11
Bay anchovy	Egg	0	0	0	0	0	157	32	67	36	0	0	0	291
	Larvae	0	0	0	0	0	304	1491	2856	1716	285	0	0	6652
	Total	0	0	0	0	0	461	1523	2923	1752	285	0	0	6944
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	<1	20	11	0	0	0	31
	Total	0	0	0	0	0	0	<1	20	11	0	0	0	31
Butterfish	Egg	0	0	0	0	0	1	<1	3	1	0	0	0	6
	Larvae	0	0	0	0	0	9	8	48	26	0	0	0	91
	Total	0	0	0	0	0	10	9	50	28	0	0	0	97
Cunner	Egg	0	0	0	0	73	167	30	2	0	0	0	0	272
	Larvae	0	0	0	0	0	1307	417	37	20	0	0	0	1781
	Total	0	0	0	0	73	1475	446	38	20	0	0	0	2053
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	1	<1	0	0	0	0	2
	Total	0	0	0	0	0	0	1	<1	0	0	0	0	2
Fourbeard rockling	Egg	<1	<1	34	22	10	7	3	<1	0	0	0	0	76
	Larvae	0	0	0	7	48	22	0	0	0	0	0	0	77
	Total	<1	<1	34	29	58	29	3	<1	0	0	0	0	153
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
	Total	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	26	375	117	0	0	0	0	518
	Total	0	0	0	0	0	26	375	117	0	0	0	0	518
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	4	0	0	0	0	0	0	0	0	0	0	9
	Total	5	4	0	0	0	0	0	0	0	0	0	0	9
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
Hogchoker	Egg	0	0	0	0	0	0	<1	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	<1	0	0	0	0	0	<1
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	5	0	0	0	0	0	0	0	0	0	0	10
	Total	5	5	0	0	0	0	0	0	0	0	0	0	10
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	526	2139	205	0	0	0	0	2870
	Total	0	0	0	0	0	526	2139	205	0	0	0	0	2870
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	3	2	0	0	0	5
	Total	0	0	0	0	0	0	0	3	2	0	0	0	5
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
	Total	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
Scup	Egg	0	0	0	0	0	100	19	<1	0	0	0	0	120
	Larvae	0	0	0	0	0	612	262	3	0	0	0	0	877
	Total	0	0	0	0	0	712	281	3	0	0	0	0	996
Searobin	Egg	0	0	0	0	230	4578	1743	410	206	0	0	0	7168
	Larvae	0	0	0	0	0	10211	726	7255	4027	0	0	0	22219
	Total	0	0	0	0	230	14789	2469	7665	4233	0	0	0	29386
Smallmouth flounder	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	0	<1	6	4	0	0	0	10
	Total	0	0	0	0	0	0	<1	7	4	0	0	0	11
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	34	19	0	0	0	53
	Total	0	0	0	0	0	0	0	34	19	0	0	0	53
Tautog	Egg	0	0	0	0	<1	<1	<1	<1	0	0	0	0	1
	Larvae	0	0	0	0	2	71	15	0	0	0	0	0	88
	Total	0	0	0	0	2	72	15	<1	0	0	0	0	89
Unidentified	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
	Total	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
Weakfish	Egg	0	0	0	0	0	3	<1	<1	0	0	0	0	4
	Larvae	0	0	0	0	0	13	7	<1	<1	0	0	0	21
	Total	0	0	0	0	0	16	8	<1	<1	0	0	0	25
Windowpane	Egg	0	0	<1	0	2	<1	<1	<1	0	0	0	0	3
	Larvae	0	0	0	0	2	2	<1	<1	<1	0	0	0	4
	Total	0	0	<1	0	4	3	<1	<1	<1	0	0	0	7
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	16	0	34	2	<1	0	0	0	0	0	52
	Total	0	0	16	0	34	2	<1	0	0	0	0	0	52
Yellowtail flounder	Egg	0	0	<1	0	0	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	<1	0	0	0	0	0	0	0	0	0	<1
Total	Egg	<1	<1	34	22	340	5024	1829	482	244	2	2	2	7981
	Larvae	179	163	193	52	87	14835	5920	10588	5838	310	24	193	38381
	Total	179	163	227	75	427	19859	7749	11070	6083	311	25	195	46362

Table 6. Monthly and annual number of adult equivalent fish potentially entrained as eggs and larvae by the Broadwater FSRU under a 30% reduction in LNGC water use and a 20% reduction in FSRU water use from baseline average flow (million gallons per day, MGD).

Flow Regime FSRU 20%, LNGC 30%, MGD= 20.4

Species & Life Stage		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
American sand lance	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	152	139	160	41	0	0	0	0	0	0	0	152	645
	Total	152	139	160	41	0	0	0	0	0	0	0	152	645
Atlantic mackerel	Egg	0	0	0	0	<1	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
	Total	0	0	0	0	<1	<1	0	1	<1	0	0	0	3
Atlantic menhaden	Egg	0	0	0	0	21	8	0	0	<1	2	2	2	35
	Larvae	0	0	0	0	0	1563	420	2	11	22	21	22	2061
	Total	0	0	0	0	21	1571	420	2	11	24	23	24	2096
Atlantic silverside	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	10	0	0	0	0	0	10
	Total	0	0	0	0	0	0	10	0	0	0	0	0	10
Bay anchovy	Egg	0	0	0	0	0	142	29	61	33	0	0	0	264
	Larvae	0	0	0	0	0	275	1349	2582	1552	258	0	0	6015
	Total	0	0	0	0	0	416	1377	2643	1584	258	0	0	6279
Black sea bass	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	<1	18	10	0	0	0	28
	Total	0	0	0	0	0	0	<1	18	10	0	0	0	28
Butterfish	Egg	0	0	0	0	0	<1	<1	2	1	0	0	0	5
	Larvae	0	0	0	0	0	8	7	43	24	0	0	0	82
	Total	0	0	0	0	0	9	8	45	25	0	0	0	87
Cunner	Egg	0	0	0	0	66	151	27	2	0	0	0	0	246
	Larvae	0	0	0	0	0	1182	377	33	18	0	0	0	1610
	Total	0	0	0	0	66	1333	403	35	18	0	0	0	1856
Feather blenny	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	1	<1	0	0	0	0	1
	Total	0	0	0	0	0	0	1	<1	0	0	0	0	1
Fourbeard rockling	Egg	<1	<1	30	20	9	6	3	<1	0	0	0	0	69
	Larvae	0	0	0	6	44	20	0	0	0	0	0	0	70
	Total	<1	<1	30	26	53	26	3	<1	0	0	0	0	138
Fourspot flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
	Total	0	0	0	0	0	<1	<1	1	<1	0	0	0	3
Gobidae spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	24	339	106	0	0	0	0	468
	Total	0	0	0	0	0	24	339	106	0	0	0	0	468
Grubby	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	4	4	0	0	0	0	0	0	0	0	0	0	8
	Total	4	4	0	0	0	0	0	0	0	0	0	0	8
Herring spp	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	0	0	0	0	0	<1
Hogchoker	Egg	0	0	0	0	0	0	<1	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	<1	0	0	0	0	0	<1
Longhorn sculpin	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	5	4	0	0	0	0	0	0	0	0	0	0	9
	Total	5	4	0	0	0	0	0	0	0	0	0	0	9
Northern pipefish	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	476	1934	185	0	0	0	0	2595
	Total	0	0	0	0	0	476	1934	185	0	0	0	0	2595
Northern puffer	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	3	1	0	0	0	4
	Total	0	0	0	0	0	0	0	3	1	0	0	0	4
Rock gunnel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
	Total	<1	<1	<1	<1	0	0	0	0	0	0	0	0	1
Scup	Egg	0	0	0	0	0	91	17	<1	0	0	0	0	108
	Larvae	0	0	0	0	0	553	237	2	0	0	0	0	793
	Total	0	0	0	0	0	644	254	2	0	0	0	0	901
Searobin	Egg	0	0	0	0	208	4139	1576	371	186	0	0	0	6481
	Larvae	0	0	0	0	0	9234	656	6560	3641	0	0	0	20091
	Total	0	0	0	0	208	13373	2233	6931	3828	0	0	0	26573
Smallmouth flounder	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	0	<1	6	3	0	0	0	9
	Total	0	0	0	0	0	0	<1	6	3	0	0	0	10
Striped cuskeel	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	0	0	0	0	0	31	17	0	0	0	47
	Total	0	0	0	0	0	0	0	31	17	0	0	0	47
Tautog	Egg	0	0	0	0	<1	<1	<1	<1	0	0	0	0	<1
	Larvae	0	0	0	0	2	64	14	0	0	0	0	0	80
	Total	0	0	0	0	2	65	14	<1	0	0	0	0	81
Unidentified	Egg	0	0	0	0	0	0	0	<1	<1	0	0	0	<1
	Larvae	0	0	0	0	0	<1	<1	<1	<1	0	0	0	<1
	Total	0	0	0	0	0	<1	<1	<1	<1	0	0	0	1
Weakfish	Egg	0	0	0	0	0	3	<1	<1	0	0	0	0	4
	Larvae	0	0	0	0	0	12	7	<1	<1	0	0	0	19
	Total	0	0	0	0	0	15	7	<1	<1	0	0	0	23
Windowpane	Egg	0	0	<1	0	2	<1	<1	<1	0	0	0	0	2
	Larvae	0	0	0	0	2	2	<1	<1	<1	0	0	0	4
	Total	0	0	<1	0	3	2	<1	<1	<1	0	0	0	6
Winter flounder	Egg	0	0	0	0	0	0	0	0	0	0	0	0	0
	Larvae	0	0	14	0	31	1	<1	0	0	0	0	0	47
	Total	0	0	14	0	31	1	<1	0	0	0	0	0	47
Yellowtail flounder	Egg	0	0	<1	0	0	0	0	0	0	0	0	0	<1
	Larvae	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	<1	0	0	0	0	0	0	0	0	0	<1
Total	Egg	<1	<1	30	20	307	4543	1654	436	221	2	2	2	7217
	Larvae	162	147	174	47	78	13415	5353	9574	5279	280	21	174	34706
	Total	162	147	205	67	386	17958	7007	10010	5500	282	23	176	41923

Table 7. Summary of Adult Equivalents with Potential Flow Reductions

		Number of Adult Equivalents												
Flow Regime	MGD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Baseline	28.2	224	204	283	93	533	24,824	9,686	13,838	7,603	389	32	243	57,953
LNGC 20%	23.9	189	173	240	79	452	21,021	8,202	11,718	6,439	330	27	206	49,075
LNGC 25%	22.8	181	165	229	75	431	20,070	7,831	11,188	6,147	315	26	197	46,855
LNGC 30%	21.7	172	157	218	72	411	19,119	7,461	10,658	5,856	300	24	187	44,636
FSRU 15%, LNGC 20%	22.9	182	165	230	76	433	20,149	7,862	11,232	6,172	316	26	198	47,040
FSRU 20%, LNGC 20%	22.6	179	163	227	75	427	19,859	7,749	11,070	6,083	311	25	195	46,362
FSRU 20%, LNGC 30%	20.4	162	147	205	67	386	17,958	7,007	10,010	5,500	282	23	176	41,923

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

Attachment 3

SPDES Permit - Effluent Parameters

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 001 & 002

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass				1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	10.7		10.7		2.4		24	mg/L				
b. Chemical Oxygen Demand (COD)	3,430		3,430		1,029		24	mg/L				
c. Total Suspended Solids (TSS)	33		33		11.27		24	mg/L				
d. Total Dissolved Solids (TDS)	NA		NA		NA		NA	NA				
e. Oil & Grease	15		15		15		NA	mg/L				
f. Chlorine, Total Residual (TRC)	0.05		0.05		0.05		NA	mg/L				
g. Total Organic Nitrogen (TON)	0.8		0.8		0.327		24	mg/L				
h. Ammonia (as N)	0.35		0.35		0.038		24	mg/L				
i. Flow	Value 4,500 m^3/h		Value 4,500 m^3/h		Value 3,600 m^3/h					Value		
j. Temperature, winter	Value Ambient – no change from intake temperature		Value		Value					Value		
k. Temperature, summer	Value Ambient – no change from intake temperature		Value		Value					Value		
l. pH	Minimum 7.4	Maximum 8.8	Minimum 7.4	Maximum 8.8	(based on samples taken from LIS, May 2005)					Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

- [ ] **Yes** - Go to Item **ii.** below.
- [X] **No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [ ] **Yes** - Concentration and mass data attached.
- [X] **No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [X] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033433

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 001 & 002

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall. Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		d. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
Sodium Hypochlorite (subject to change pending approval from NYSDEC to separate water intakes) CAS Number: 7681-52-9	0.05		0.05		0.05		NA	mg/L	(ppm)				
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033434

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 003

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass				1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	10.7		10.7		2.4		24	mg/L				
b. Chemical Oxygen Demand (COD)	3,430		3,430		1,029		24	mg/L				
c. Total Suspended Solids (TSS)	33		33		11.27		24	mg/L				
d. Total Dissolved Solids (TDS)	NA		NA		NA		NA	NA				
e. Oil & Grease	15		15		15		NA	mg/L				
f. Chlorine, Total Residual (TRC)	0.05		0.05		0.05		NA	mg/L				
g. Total Organic Nitrogen (TON)	0.8		0.8		0.327		24	mg/L				
h. Ammonia (as N)	0.35		0.35		0.038		24	mg/L				
i. Flow	Value 98 m^3/h		Value 98 m^3/h		Value 98 m^3/h					Value		
j. Temperature, winter	Value Ambient – no change from intake temperature		Value		Value					Value		
k. Temperature, summer	Value Ambient – no change from intake temperature		Value		Value					Value		
l. pH	Minimum 7.4	Maximum 8.8	Minimum 7.4	Maximum 8.8	(based on samples taken from LIS, May 2005)					Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

- [ ] **Yes** - Go to Item **ii.** below.
- [X] **No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [ ] **Yes** - Concentration and mass data attached.
- [X] **No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [X] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033435

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 003

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall.

Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		d. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
Sodium Hypochlorite CAS Number: 7681-52-9	0.05		0.05		0.05		NA	mg/L	(ppm)				
Salinity CAS Number:	25		25		25		NA	g/L	(ppt) (based on samples taken from LIS, May 2005)				
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033436

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 004

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass				1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	2.6		2.6		2.6		NA	mg/L				
b. Chemical Oxygen Demand (COD)	3,430		3,430		1,029		24	mg/L				
c. Total Suspended Solids (TSS)	3.1		3.1		3.1		3.1	mg/L				
d. Total Dissolved Solids (TDS)	NA		NA		NA		NA	NA				
e. Oil & Grease	15		15		15		NA	mg/L				
f. Chlorine, Total Residual (TRC)	0		0		0		NA	ug/L				
g. Total Organic Nitrogen (TON)	0.8		0.8		0.327		24	mg/L				
h. Ammonia (as N)	0.35		0.35		0.038		24	mg/L				
i. Flow	Value 19 m^3/day		Value 19 m^3/day		Value 19 m^3/day					Value		
j. Temperature, winter	Value Ambient – no change from intake temperature		Value		Value					Value		
k. Temperature, summer	Value Ambient – no change from intake temperature		Value		Value					Value		
l. pH	Minimum 7.4	Maximum 8.8	Minimum 7.4	Maximum 8.8	(based on samples taken from LIS, May 2005)					Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

- [ ] **Yes** - Go to Item **ii.** below.
- [X] **No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [ ] **Yes** - Concentration and mass data attached.
- [X] **No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [X] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033437

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 004

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall.

Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		d. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
Sodium Hypochlorite (subject to approval from NYSDEC of MBR Unit) CAS Number: 7681-52-9	0		0		0		NA	ug/L	(ppb)				
Fecal Coliform CAS Number:	10.6 cts/100 ml		10.6 cts/100 ml		10.6 cts/100 ml			counts/ml					
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033438

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 005

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass				1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	10.7		10.7		2.4		24	mg/L				
b. Chemical Oxygen Demand (COD)	3,430		3,430		1,029		24	mg/L				
c. Total Suspended Solids (TSS)	33		33		11.27		24	mg/L				
d. Total Dissolved Solids (TDS)	NA		NA		NA		NA	NA				
e. Oil & Grease	15		15		15		NA	mg/L				
f. Chlorine, Total Residual (TRC)	0.05		0.05		0.05		NA	mg/L				
g. Total Organic Nitrogen (TON)	0.8		0.8		0.327		24	mg/L				
h. Ammonia (as N)	0.35		0.35		0.038		24	mg/L				
i. Flow	Value 33 m^3/h		Value 33 m^3/h		Value 33 m^3/h					Value		
j. Temperature, winter	Value Ambient – no change from intake temperature		Value		Value					Value		
k. Temperature, summer	Value Ambient – no change from intake temperature		Value		Value					Value		
l. pH	Minimum 7.4	Maximum 8.8	Minimum 7.4	Maximum 8.8	(based on samples taken from LIS, May 2005)					Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

- [ ] **Yes** - Go to Item **ii.** below.
- [X] **No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [ ] **Yes** - Concentration and mass data attached.
- [X] **No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [X] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033439

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 005

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall. Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		d. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
Sodium Hypochlorite CAS Number: 7681-52-9	0.05		0.05		0.05		NA	mg/L	(ppm)				
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033440

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 006

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass				1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	10.7		10.7		2.4		24	mg/L				
b. Chemical Oxygen Demand (COD)	3,430		3,430		1,029		24	mg/L				
c. Total Suspended Solids (TSS)	33		33		11.27		24	mg/L				
d. Total Dissolved Solids (TDS)	NA		NA		NA		NA	NA				
e. Oil & Grease	15		15		15		NA	mg/L				
f. Chlorine, Total Residual (TRC)	0.05		0.05		0.05		NA	mg/L				
g. Total Organic Nitrogen (TON)	0.8		0.8		0.327		24	mg/L				
h. Ammonia (as N)	0.35		0.35		0.038		24	mg/L				
i. Flow	Value 1,100 m^3/h		Value 1,100 m^3/h		Value 1,100 m^3/h					Value		
j. Temperature, winter	Value Ambient + 11ºC		Value Ambient + 11ºC		Value Ambient + 11ºC (subject to treatment of discharge to return to ambient)					Value		
k. Temperature, summer	Value Ambient +11ºC		Value Ambient + 11ºC		Value Ambient + 11ºC (subject to treatment of discharge to return to ambient)					Value		
l. pH	Minimum 5.5	Maximum 6	Minimum 5.5	Maximum 6	(subject to treatment of discharge to return to ambient)					Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

- [X] **Yes** - Go to Item **ii.** below.
- [ ] **No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [X] **Yes** - Concentration and mass data attached.
- [X] **No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [ ] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033441

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 006

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall.

Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		d. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
Sodium Hypochlorite CAS Number: 7681-52-9	0.05		0.05		0.05		NA	mg/L	(ppm)				
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033442

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 007

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass				1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	10.7		10.7		2.4		24	mg/L				
b. Chemical Oxygen Demand (COD)	3,430		3,430		1,029		24	mg/L				
c. Total Suspended Solids (TSS)	33		33		11.27		24	mg/L				
d. Total Dissolved Solids (TDS)	NA		NA		NA		NA	NA				
e. Oil & Grease	15		15		15		NA	mg/L				
f. Chlorine, Total Residual (TRC)	0.05		0.05		0.05		NA	mg/L				
g. Total Organic Nitrogen (TON)	0.8		0.8		0.327		24	mg/L				
h. Ammonia (as N)	0.35		0.35		0.038		24	mg/L				
i. Flow	Value 500 m^3/h		Value 500 m^3/h		Value 500 m^3/h					Value		
j. Temperature, winter	Value Finalize during Front End Engineering Design (FEED) Stage. For Emergency Operation only											
k. Temperature, summer	Value Finalize during Front End Engineering Design (FEED) Stage. For Emergency Operation only											
l. pH	Minimum 7.4	Maximum 8.8	Minimum 7.4	Maximum 8.8	(based on samples taken from LIS, May 2005)					Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

	Yes - Go to Item **ii.** below.
X	**No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

	Yes - Concentration and mass data attached.
X	**No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

X	**Yes** - Source or reason for presence in discharge attached
	Yes - Quantitative or qualitative data attached
	No

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033443

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 007

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall.

Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		d. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
Sodium Hypochlorite CAS Number: 7681-52-9	0.05		0.05		0.05		NA	mg/L	(ppm)				
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033444

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 008

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass				1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	10.7		10.7		2.4		24	mg/L				
b. Chemical Oxygen Demand (COD)	3,430		3,430		1,029		24	mg/L				
c. Total Suspended Solids (TSS)	33		33		11.27		24	mg/L				
d. Total Dissolved Solids (TDS)	NA		NA		NA		NA	NA				
e. Oil & Grease	15		15		15		NA	mg/L				
f. Chlorine, Total Residual (TRC)	0.05		0.05		0.05		NA	mg/L				
g. Total Organic Nitrogen (TON)	0.8		0.8		0.327		24	mg/L				
h. Ammonia (as N)	0.35		0.35		0.038		24	mg/L				
i. Flow	Value 300 m^3/h		Value 300 m^3/h		Value 300 m^3/h					Value		
j. Temperature, winter	Value Finalize during Front End Engineering Design (FEED) Stage. For Emergency Operation only											
k. Temperature, summer	Value Finalize during Front End Engineering Design (FEED) Stage. For Emergency Operation only											
l. pH	Minimum 7.4	Maximum 8.8	Minimum 7.4	Maximum 8.8	(based on samples taken from LIS, May 2005)					Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?

- [ ] **Yes** - Go to Item **ii.** below.
- [X] **No** - Go to Item **b.** below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [ ] **Yes** - Concentration and mass data attached.
- [X] **No** - Go to Item **ii.** below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [X] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033445

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: Broadwater Energy, LLC	SPDES No.:	Outfall No.: 008

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall. Page of

Pollutant and CAS Number	Effluent data							Units		Intake data (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		d. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
Sodium Hypochlorite CAS Number: 7681-52-9	0.05		0.05		0.05		NA	mg/L	(ppm)				
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

BW033446

20080408-5060 FERC PDF (Unofficial) 4/8/2008 3:28:25 PM

CERTIFICATE OF SERVICE

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

Dated at Washington, D.C. this 8th day of April 2008.

/s/ Brett A. Snyder
Brett A. Snyder

Document Content(s)

BW040808w.PDF.....1-64