RESPONSE TO PUBLIC COMMENTS

The Algonquin Gas Transmission Company, HubLine Pipeline Project

On January 10, 2003, the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) released for public notice and comment a draft National Pollutant Discharge Elimination System (NPDES) permit developed pursuant to an application from the HubLine Pipeline Project, for the issuance of a permit to discharge approximately 5 million gallons of flood water from a barge located at the mouth of the Fore River in Weymouth, MA and 0.5 million gallons from second barge located 8 miles offshore from Winthrop, MA. The floodwater is treated with a biocide, tetrakis hydroxymethyl phosphonium sulfonate (THPS), to inhibit microbially induced corrosion. The biocide will be neutralized with hydrogen peroxide prior to discharge. An additional similar volume of untreated hydrostatic test sea water shall be discharged from the same locations.

The public comment period for this draft permit expired on February 8, 2003. Comments were received from the following:

TRC Environmental Corporation (on behalf of the permittee)
The Massachusetts Division of Marine Fisheries (DMF)
The Massachusetts Office of Coastal Zone Management (CZM)
The Massachusetts Riverways Program
The Massachusetts Dept. of Environmental Protection (DEP) submitted an Antidegradation Review pursuant to Title 314 CMR 4.04 and 40 CFR §131.12, dated February 24, 2003.

After a review of the comments received, EPA has made a final decision to issue the permit authorizing this discharge. The following response to comments describes the changes that have been made to the permit from the draft and briefly describes and responds to the comments on the draft permit. Clarifications which EPA considers necessary are also included below. The comment letters are part of the administrative record and they may be paraphrased herein. A copy of the final permit may be obtained by writing or by calling Doug Corb, EPA Massachusetts NPDES Permits Program (CPE), 1 Congress Street, Suite 1100, Boston, MA 02114-2023; telephone: (617) 918-1565.

TRC Environmental Corp. Comments (concerning typographical errors only)

Comment 1 *:* On Page two of the draft permit, the first paragraph describes the discharge as ballast water. The correct term is flood water.

Response 1: The final permit shall be corrected accordingly.

The Massachusetts Division of Marine Fisheries Comments

Comment 1 : No information has been received regarding actual field application of this procedure elsewhere. Information relative to the actual decay rate of the biocide, and therefore the biocide final concentration to be neutralized, is not available for conditions at the discharge locations. Information provided by the Applicant suggests the final concentration of residual biocide after neutralization at end of pipe should be protective of marine and anadromous fishery resources. However in the absence of prior field experience with the floodwater neutralization procedure, Maine Fisheries believes the permit for the end of pipe effluent discharge limitations should be augmented by operational safeguards in the absence of previous field operation experience.

Marine Fisheries recommends that the initial floodwater treated with hydrogen peroxide for neutralization be placed in a 150,000 gallon ballast tank and tested for compliance with the permitted concentration before being added to the remaining ballast tanks on the barge(s). Should the biocide concentration exceed the permitted concentration, this floodwater would be re-circulated back to the hydrogen peroxide dosing device for further treatment. It is also assumed that the addition of hydrogen peroxide will restore the oxygen content of the floodwater which is expected to be anoxic when delivered to the neutralization process. Marine Fisheries recommends that the Applicant allow sufficient time for the floodwater in the barge to equilibrate with the atmosphere to ensure oxygen-depleted floodwater is not discharged to the receiving waters.

During the entire discharge of neutralized floodwater the Applicant should visually monitor the receiving waters for any indications of a fish kill, and should cease discharging in the event of a fish kill. Marine Fisheries requests notification within twenty four hours in the event of a fish kill.

Response 1: The following three conditions are found in the DEP, Anti-degradation Review and Determination dated February 24, 2003.

The discharge of the floodwaters [treated with a biocide and then the biocide removed to low levels with hydrogen peroxide] under this NPDES permit will not cause violations of the Massachusetts Surface Water Quality Standards. In addition, the following operational requirements will enhance compliance with the permit conditions:

- use of multiple chamber barges with sufficient capacity for re-cycling and testing to assure that the treated effluent is not discharged above required permit limits
- discharge will meet the dissolved oxygen standard of the receiving water
- visual observations will be made at least hourly (when collecting samples for testing) to check for fish kills, sheens or other perceived operational problems plus having a mechanism in place to halt the discharge if problems develop

These conditions directly address the concerns stated by the DMF and shall be added to the final permit as a further margin of protection. Additionally, a condition shall be incorporated in the final permit to require the notification of DMF of any fish kills. The permittee has stated:

> Algonquin Gas Transmission Company will have environmental personnel on site during the entire discharge and once per hour will observe the receiving water for evidence of a fish kill. Monitoring will be documented in a log book. If a fish kill occurs, the discharge will be stopped until the cause of the fish kill can be determined and remedied. Notification will be made to Marine Fisheries [DMF] *within 24 hours of a fish kill.*

Massachusetts Office of Coastal Zone Management (CZM) Comments

Comment 1: CZM is pleased to see that the draft permit requires that the biocide (tetrakis hydroxymethyl phosphonium sulfonate-THPS) be neutralized to a maximum level of 4.4 parts per million (ppm) THPS before any hydrostatic test water can be discharged. CZM is also pleased that hourly field measurements will be taken to ensure that the appropriate amount of neutralizing agent (3% hydrogen peroxide) is added before any discharge occurs. CZM is concerned, however, that part of the neutralizing protocol that the applicant committed to in pre-draft discussions has not been incorporated into the draft penmit (see Appendix C, Section 1.2, Supplemental Information Package for Application for National Pollutant Discharge Elimination System (NPDES) Permit for MA0040169, submitted by Duke Energy Gas Transmission, September 20, 2002). Specifically, in its proposed procedure for dewatening the pipeline, the applicant proposed to discharge the biocide treated test water to a "series of ballast tanks within the material barges", where a "sample of treated water from the last tank prior to overboard discharge ... will be tested to confinn the target discharge THPS (4.4 ppm). If the target level of < 4.4 ppm has not been achieved, then the treated water will be circulated back through the tanks and additional hydrogen peroxide will be added to achieve neutralization." The applicant believes that this mixing between separate ballast tanks will create a homogenous mixture, thereby ensuring adequate neutralization throughout the volume of hydrostatic test water. Plans for the initial storage and treatment of biocide-treated water included in the Supplemental Information Package indicated that two storage barges would be located at the Weymouth Fore River estuary discharge site but that only one barge was proposed for the Deer Island site.

Information presented in the Supplemental Information Package makes it clear that it is the applicant's intention to utilize multiple ballast tanks at each discharge site, regardless of the number of barges required. As in the Supplemental Information Package, multiple ballast tanks are required for recirculating, should it be found that THPS in the test water has not been adequately neutralized. Given that the applicant, to our knowledge, has never used this neutralization procedure before, that the decay rate of untreated THPS under the conditions likely to be experienced during this procedure is unknown and highly dependent upon water temperature and pH, and that un-neutralized THPS at the concentration proposed by the applicant has been shown to be toxic to shrimp, oysters, fish, copepods, and phytoplankton. CZM suggests that EPA explicitly state in the NPDES permit and fact sheet that multiple ballast

tanks should be used to ensure adequate mixing of the THPS-treated water with the hydrogen peroxide neutralizing agent. While CZM recognizes that EPA has stated in the NPDES permit that "no flood water shall be discharged to the receiving waters until it has been analyzed ... and the concentration determined to be at or below 4.4 mg/l THPS" and that any discharges in concentrations greater than this level must be reported. CZM believes that adequate mixing of THPS biocide and its neutralizing agent can be assured only through requiring the mixing that is achieved through multiple ballast tanks. We believe that a multiple-ballast tank mixing procedure will ensure a proactive, prevention-based approach that is protective of the biotic resources of Massachusetts Bay.

Response 1: The concerns raised by CZM are similar to those raised by DMF. The supplemental permit conditions described in the previous response (to DMF) also address the CZM comments. EPA notes that the manufacturers of the biocide, THPS, have provided whole effluent toxicity test results for a broad range of species, which demonstrate extremely low toxicity (See Facts Sheet, Pages 10-11). The discoverer of THPS received EPA's 1997 Designing Safer Chemicals Award. The following is from the award summary:

> Conventional biocides, used to control the growth of bacteria, algae, and fungi in industrial cooling systems, oil fields, and process applications, are highly toxic to humans and aquatic life and often persist in the environment, leading to long-term damage. To address this problem, a new and relatively benign biocide, tetrakis (hydroxymethyl) phosphonium sulfonate (THPS), has been discovered by Albright & Wilson Americas. THPS biocides represent a completely new class of antimicrobial chemistry that combines superior antimicrobial activity with a relatively benign toxicology profile. **THPS's benefits include low toxicity, low recommended treatment level, rapid breakdown in the environment, and no bioaccumulation**. When substituted for more toxic biocides, THPS biocides provide reduced risks to both human health and the environment.

Given the low total volume, low discharge rate, brief duration, high dilution, and significant depth at the points of discharge, the extensive permit conditions should offer an adequate margin of safety to offset the lack of local experience with similar operations.

Massachusetts Riverways Comments

Comment 1: The Weymouth Fore River will be the discharge point for over five million gallons of biocide treated and neutralized salt water, this location is also the most sheltered location along the span of the pipe line as it crosses Mass Bays. The Fact Sheet points out the estuary appears to have sufficient flushing to accommodate this discharge based on modeling done for another project. The diagram showing the barge configuration and diffuser does not indicate the depth of water, only that the diffuser will be submerged to a four foot depth.

What is the depth of the water at the Weymouth Fore River discharge point at neap low water? Was the approximate dilution range, at low tide and high tide, of the discharge estimated?

Response 1: The Fore River has a depth of 35 ft at mean low water according to the Army Corps of Engineers. At neap tide it may be one to two feet lower. The tidal range for the Fore River is approximately 10 ft. We can estimate the discharge shall occur 29 - 30 ft above the seabed on a neap tide. The river width is approximately 1000 feet at the point of discharge.

TRC conducted rudimentary dilution modeling of the Fore River discharge site using CORMIX (See the September 2002, Supplemental Information Package submitted by TRC). Dilutions are not calculated directly at high and low tide by the models recognizing that the current induced dilution briefly drops close to zero at slack tide. The dilution calculations were developed for the periods, 1, 2, and 3 hours before and again after slack tide. The simulation indicates a dilution factor between 75:1 and greater that 100:1 for the effluent in the jet /Plume near field mixing region (near field) of CORMIX. The model predicts that the discharge will not contact the shore. The model further predicts that even without neutralization, the effluent would achieve sufficient dilution within a few meters from the point discharge to lower the THPS concentration to where there is no "reasonable potential" for toxicity.

A far more comprehensive flow model of the fore River is referenced on Page 12 of the fact sheet. It demonstrates that there is extensive flushing in the estuary and very short residence times of pollutants introduced to the Fore River.

Comment 2: The maximum concentration of THPS allowed under the draft permit is 4.4 mg/l. How was this concentration arrived at?

Response 2: The effluent limit of 4.4 mg/l is based on a review of the whole effluent toxicity data available for the THPS. A concentration of 4.4 mg/l presents no toxicity to most species. The Massachusetts Water Quality Standards Implementation Policy for the Control Toxic Pollutants to Surface Water, February 23, 1990, recommends that the receiving water concentration after initial dilution be less than or equal to the No Observable Effects Concentration. With minimal dilution, the concentration of THPS will be below the concentration where any toxicity was exhibited by the most sensitive species tested.

Comment 3: The WET test results in the Fact Sheet show some toxicity at 3.4 and 1.4 mg/I to the American oyster (extrapolated data and not actual test findings), concentrations lower than those found in the permit.

Response 3: See the previous response. It should also be noted that most of the whole effluent toxicity data available is for tests of greater duration than the 36 hour discharge(s) planned by the permittee. Further, tides and currents will insure at most very brief exposure of organisms to the maximum discharge concentration of 4.4 mg/l.

Comment 4: What are the marine resource, especially filter feeders, in the vicinity of the discharge point?

Response 4: Hydroids, bryozoans, sponges, tunicates, barnacles, and blue mussels may exist on the pilings associated with the Excelon property bulkhead. The point of discharge will be located at least 50 feet from these pilings, and based on the dilution modeling, these organisms would be exposed to concentrations at least 30 times lower than the maximum discharge concentration of 4.4 mg/l THPS.

The only commercially harvested shellfish in the vicinity of the Fore River discharge is the soft-shell clam (*Mya arenaria*). The productive shellfish beds in the Fore River are located in Mill Cove, Kings Cove, Wessagussett Beach, and Germantown Point. All shellfish in these areas must go through depuration. The distance from the discharge to any of the shellfish beds insures that the THPS will have no effect on this resource.

Comment 5: The discharge will be at a rate of 2,400 gpm. At this rate, it will take over 36 hours to release the volume of water in the pipe line. Will the discharge be continuous or will it occur only during certain times or tide cycles?

Response 5: The discharge is anticipated to be continuous unless the discharge needs to be interrupted to ensure that the THPS discharge concentration remains below 4.4 mg/l or if there is evidence of a fish kill.

Comment 6 : The Fact Sheet contained information showing THPS biocide to pose only a small whole effluent toxicity even before neutralization though there is some potential for toxicity. The Fact Sheet explained that biocide was a necessary addition if salt water was to be used in the pipe placement process. How essential is the addition of salt water to the pipe laying process? If the process is doable even if it is slightly more difficult, it would be preferable to avoid the use of a biocide and lay dry pipe.

Response 6: The permittee must add water to the pipe to aid in the jetting and lowering of the pipeline. The flooding of the pipeline is essential to make it negatively buoyant given the depth of burial needed to meet the requirements of the project.

Comment 7: Could ultraviolet treated and filter fresh water be used in lieu of biocide treated salt water? Are there other methods that have been successfully used in similar endeavors that do not require the use of toxic substances?

Response 7: The use of biocide treated water is the industry standard practice. Water supplies sufficient to provide 5.5 million gallons of freshwater at the introduction point of the pipeline will likely contain 100 to 300 ug/l of residual chlorine, making it far more toxic than the THPS treated water. The cost and logistics of substituting UV treated freshwater for salt water are disproportionate to any environmental gains that might be realized.

Comment 8: How long does it take to determine the concentration of THPS in a sample?

Response 8: The test may be performed in 15-20 minutes.

Comment 9: Are discharges curtailed while the THPS sampling is completed to prevent the inadvertent release of effluent with concentrations in excess of 4.4 mg/l?

Response 9: No, the sampling point will occur early enough in the flow path to allow the testing to be completed before any neutralized floodwater is discharged overboard.

Comment 10: How is the hydrogen peroxide added to the tanks and mixed to achieve a thorough dispersion of the hydrogen peroxide to achieve neutralization through out the tanks?

Response 10: The hydrogen peroxide is added through an injection port in the discharge piping for the introduction and mixing of the neutralizing agent. The rate of flow induced by pumping and the discharge over a splash plate into the barge tank will thoroughly mix the water and hydrogen peroxide.

Comment 11: What sort of tanks will be used for the holding and neutralization process or more specifically will the tanks be made of a nonreactive material to prevent unanticipated chemical interactions during the neutralization process?

Response 11: The tanks are the individual chambers within a material barge designed for holding/hauling various types of material. The barge is made out of steel. The THPS is used to prevent reaction with steel welds and as such should not react with the steel barge.

Comment 12: Could the tanks have residual contaminants from a previous use?

Response 12: The barges will be chartered by the permittee. Prior to use they will go through an "on-charter survey" that will have a requirement to document the immediately previous use of the barge(s) and to document the lack of residual contaminants of concern.

Comment 13: The WET tests were for water with THPS additive only. Is there any toxicity potential for waters with both hydrogen peroxide and THPS if neither chemical is completely consumed in the chemical reaction processes?

Response 13: The intent of the testing is to dose with hydrogen peroxide at the appropriate level to maximize neutralization of THPS without excess hydrogen peroxide so that the potential for unconsumed chemical is small, and therefore, the toxicity potential is small. Three percent hydrogen peroxide solution is a mild oxidizing agent which could have at most a negligible impact at the point of discharge before it breaks down to water and oxygen.

Comment 14: The biocide is said to naturally degrade in the pipe. What is the time frame of this degradation compared to how long will the biocide treated water be in the pipe?

Response 14: The rate of degradation is dependent upon the level of biological activity in the seawater, temperature, pH, and other factors. The initial THPS concentration is anticipated to be 125 mg/l. The supplemental information filed with the application provided 1/2 life decay rates, ranging between 7 to 131 days. It is estimated that the floodwater could be in the pipe between 1 and 2 months.

Comment 15: The hydrostatic test water will be added immediately after the purging of the biocide treated water. Is there a possibility of trace amounts of the biocide being dissolved into the hydrostatic test water.

Response 15: There will be a pig pushed by the hydrostatic test water that in essence squeegees the floodwater forward so that, if any floodwater remains, it will be a only film on the pipe surface. The dilution ratio with the hydrostatic test water will be in excess of a 1000:1 prior to discharge.

Comment 16 The hydrostatic testing to determine if the pipeline is free of leaks and problems will be occurring after the biocide treated water has been used. While it is certainly the desire of the company to lay the pipeline perfectly initially, especially given its location on the ocean bottom and the challenge of repairing a problem under these circumstances, the integrity of the pipeline may not be definitively determined until the hydrostatic testing is complete. Will all pipes and joints be tested for leaks and faults before being filled with biocide solution? What precautions will be in place to prevent spills during the mixing of the salt water with the biocide?

Response 16: As the pipeline is assembled, each weld is ultrasonically tested to DOT standards such that no leaks should exist. The project operates under an extensive DOT approved Spill Prevention and Control and Countermeasures Plan to reduce risks of spills.

Comment 17: The permit requires sampling hydrogen peroxide once per discharge and the measurement type is listed at 'measured'. Could this sampling method be clarified? Does it mean a known concentration is added or is the effluent before discharge measured and the concentration ascertained?

Response 17: The permit requirement is intended to document the concentration of the hydrogen peroxide injection solution as it is obtained from the manufacturer, so it will be tested prior to injection into the floodwater. A 3% solution of hydrogen peroxide will be used. There are colorimetric kits called "Chemetrics brand -Titrets" made for determining the concentration of H_2O_2 in the range of 2%-20%. These kits come with 30 tests, consisting of ampules that contain a vacuum sealed liquid titrant. You draw in a fixed volume of the H_2O_2 and wait for the color change, then read the concentration on a scale. The test is more accurate for the lower percentages (e.g., the scale has more graduations for the 2% to 5% range). The scale can read increments of 0.2% in that range, and have an accuracy of +/- 0.0015%. The initial concentration of the H_2O_2 will be determined as it is added to the floodwater. The concentration of the THPS will be determined prior to discharge.

Comment 18 : Does hydrogen peroxide pose a threat to marine resources if it is released into the Weymouth Fore River Estuary?

Response 18: There is minimal threat to marine life from a discharge of hydrogen peroxide because the hydrogen peroxide rapidly disassociates to water and oxygen. Three percent hydrogen peroxide solution is a mild oxidizing agent which could have at most, a negligible impact at the point of discharge before it breaks down.

Comment 19 : Total suspended solids are to be monitored during the first hour. While it seems unlikely the filtered sea water used in the pipeline would contain any solids, if solids were to be present they may be more likely to be concentrated in the bottom waters of the holding tank which may be discharged toward the end of the discharge event.

Response 19: The final permit shall be changed to add an additional TSS sampling event near the end of the dewatering process. This will address TSS introduced from the pipe and from the tank bottom.