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November 14, 2005

Mr. Jeffrey Crawford
Principal Environmental Scientist
Rhode Island Department of Environmental Management
Office of Waste Management
235 Promenade Street
Providence, RI 02908

RE: Evaluation of Supplemental Phase 2 Site Investigation Report
Bay Street Suspected Fill Areas
Tiverton, Rhode Island

Dear Mr. Crawford:

The purpose of this letter is to provide you with comments on the Supplemental Phase 2 Site Investigation Report (SSIR) for the Bay Street Suspected Fill Area prepared by Vanasse Hangen Brustlin, Inc. (VHB) on behalf of New England Gas Company (NEGC). Fuss & O'Neill, Inc. (Fuss & O'Neill) conducted a review of the SSIR and prepared this letter on behalf of the Environmental Neighborhood Awareness Committee of Tiverton (ENACT), which represents the interests of neighborhood residents and property owners. The key issues faced by the community are as follows:

- **Possession/Occupancy of Contaminated Property:** In 2002, contaminated soil was identified beneath roadways in the Bay Street neighborhood. Environmental investigations conducted between 2002 and 2005 identified widespread manufactured gas plant (MGP) waste across the Bay Street neighborhood (the "site").
- **Threats to Health:** Concentrations of compounds found in MGP waste have been detected in shallow soil at concentrations that exceed Rhode Island Department of Environmental Management (RIDEM) Method 1 criteria, which are designed to be protective of human health. Isolated areas have exhibited concentrations great enough to be considered an imminent health risk by RIDEM and require immediate soil removal.
- **Standard of Living:** The Town of Tiverton has placed a moratorium on building and excavation within the Bay Street neighborhood restricting home improvements and halting much needed utility repairs/updates.

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- **Financial Hardship:** Property owner's financial assets have been frozen based on actual and perceived risks.

The August 2005 SSIR prepared by VHB documents the latest of a series of on-going investigations focused on characterizing the environmental impacts to the Bay Street neighborhood from MGP waste. Although the quantity of data gathered at the site is substantial, it is our opinion, and ENACT's, that the investigations completed to date have not adequately characterized the site or presented a clearly defined conceptual model with which to focus additional investigations or develop a remedial strategy. Comments on the SSIR, as well as response items which should be incorporated into future efforts, are outlined below and discussed in the following sections:

- a) The assessments completed to date have not met the standard of a Site Investigation Report (SIR), as defined by Section 7 of the RIDEM Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases (Remediation Regulations).
- b) The investigation has not been adequately focused to meet remedial and community goals.
- c) Conducting a Method 3 Risk Assessment to evaluate compliance with RIDEM Remediation Regulations is not appropriate.
- d) Documentation of compliance with the Remediation Regulations, in the form of a "Letter of Compliance" for all portions of the site is required; a letter of "no further action required" is not sufficient.
- e) Compliance and remedial efforts should be approached on a site-wide basis and not a property-by-property basis

The following paragraphs summarize several key points regarding each of the overriding issues outlined above.

1.0 THE SITE INVESTIGATION REPORT IS NOT COMPLETE

1.1 Deficiencies in the Site Investigation Report

The following deficiencies were noted in the SSIR:

- a) The objectives of the investigation were not clearly defined.
- b) The SIR checklist, specified in Section 7.08 of the Remediation Regulations, was not included in the SSIR.



- c) The data was not presented in a manner that aids in understanding site conditions and selection of a remedy for the contaminated site. For example:
 - i. Inconsistencies were noted in the mapping of soil exceedances (e.g. Figure 10 identifies exceedances of the RIDEM Residential Direct Exposure Criteria (RDEC) on Block 3 Lot 2; however, these exceedances do not appear on any of the compound-specific exceedance maps).
 - ii. Soil exceedances are plotted on maps but no attempt is made to delineate the extent of the exceedances with adjacent borings that do not exceed criteria. In many instances, this gives the appearance that additional delineation of exceedances is required.
 - iii. Exceedances of the RDEC have been plotted on a map and are presented as a statistical subset of native and non-native samples, but no presentation of the vertical extent of RDEC exceedances has been offered. VHB stated that the statistics indicate that there is no strong relationship between observed non-native material and exceedances of the RDEC; however, vertical profiling may indicate that elevated concentrations in native material are related to leaching from heavily impacted fill materials.
 - iv. Mapping and data tables do not appear to take into consideration relevant historical soil data, including data collected from borings in the roadways. In addition, although investigations conducted by others are summarized in the SSIR, the information does not appear to be incorporated into a conceptual model of the site.
 - v. Mapping of the known extent of MGP waste (and perhaps other “non-native” materials) would aid in understanding site conditions.
- d) A minimum of two remedial alternatives in addition to the no action/natural attenuation alternative were not evaluated as required by Section 7.04 of the Remediation Regulations.

1.2 Deficiencies in the Site Investigation

VHB has acknowledged eight specific deficiencies in the Supplemental Phase 2 Site Investigation. These deficiencies, as outlined in the SSIR included:

- the investigation of the study area has not been completed,
- all desired data has not been obtained or evaluated,
- data from July 19, 2005 was not included in the SSIR due to time constraints,
- not all properties have been investigated – some due to denial of access,
- background concentrations of arsenic in soil have not been evaluated,
- other sources contributing to contamination at the site have not been fully researched,
- site history research, including identification of other responsible parties, is on-going, and
- because of the above, VHB indicated that no final conclusions could be made.



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Fuss & O'Neill concurs that these are significant deficiencies in the Site Investigation that prevent an adequate evaluation of the site with respect to the degree and extent of contamination. They also hinder assessment of potential risks to human health and appropriate remedial alternatives. In addition to the above limitations, we have also identified the following deficiencies in the investigation:

- a) The vertical and horizontal extent of MGP waste has not been documented. Observations of “non-native” material have been documented and exceedances of RIDEM Method 1 criteria have been mapped to a limited extent; however, this information has not been related to a conceptual model that actually characterizes and defines the extent of MGP waste in the Bay Street neighborhood. Consequently, the limits of the site have not yet been confirmed.

As an example, “non-native” material has been observed on Block 3 Lot 1A and Block 7 Lot 4, indicating that fill is present at the limits of the investigations conducted to date. In addition, mapping provided in the SSIR indicates that soil exceedances of RIDEM Method 1 criteria are present at the northern, eastern, and southern extents of the investigated area. Block 5, west of Church Street, has not yet been investigated. Exceedances to the north, west, southwest, and southeast suggest that MGP waste may also be present in this uninvestigated area. This data indicates that the full extent of the site has not been investigated and that the extent of MGP waste has not been delineated.

As stated in Section 7.01 of the Remediation Regulations, determining the nature and extent of the contaminated site is a key component of a Site Investigation and is necessary to evaluate risks to potential receptors and appropriate remedial alternatives. The extent of MGP waste at the site should be determined independent of RDEC exceedances in order to define the release area.

- b) NEGC cites the potential for other sources contributing to contamination at the site; however, it is not apparent that background, MGP waste, or urban fill materials have been adequately characterized to allow for a determination of what impacts, if any, may be related to other sources or what background conditions may be. If the materials cannot be distinguished in the field by visual observation because of similarities in appearance, then a chemical baseline should be established against which to assess the potential for a given area to be impacted specifically by MGP waste.
- c) Investigation activities appear to focus on portions of properties not located within Town rights-of-way. Not only does this create potential data gaps in delineating the extent of impacts, but the potential exists for significant threats to human health to go undetected.



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- d) To date, the portion of the site that has been investigated covers approximately 60 acres of land. Only seven groundwater monitoring wells have been installed over this large area. The limited groundwater sampling conducted to date has revealed that cyanide and mercury have been detected in groundwater at concentrations approaching or exceeding the RIDEM GA Groundwater Objectives. The full extent, distribution, and magnitude of groundwater contamination has not been characterized. Since groundwater beneath the site is identified as “GA” by RIDEM, groundwater at the site may be used as a private or public drinking water source without treatment. Consequently, the extent and magnitude of any groundwater contamination must be thoroughly investigated in order to protect human health and long term groundwater quality at the site. Any detection of contaminants in groundwater, even if they do not exceed GA Groundwater Objectives, must be evaluated to determine if seasonal or precipitation based fluctuations in groundwater level or flow may affect the concentrations of contaminants in groundwater. As documented in the SSIR groundwater quality has been observed to fluctuate in several of the existing monitoring wells, even over a relatively short period of several days. Compliance with the GA Groundwater Objectives has not been demonstrated.

2.0 INVESTIGATION FOCUS

An effective Site Investigation must be designed and implemented to address and support the release scenario, the applicable regulatory requirements, and the preferred remedial alternative. It is our opinion that the SSIR has not adequately addressed these items, as discussed further below:

- a) The release scenario has not been adequately defined: The SSIR indicates that parties other than NEGC may have contributed to impacts in the Bay Street neighborhood but that those sources have not yet been researched. Likewise, the SSIR indicated that a review of current and past uses of the site is on-going and has not been completed. In addition, information on background conditions (including urban fill), which aids in understanding the release scenario, is lacking. If other sources are to be identified as contributing to contamination at the site, knowledge of essential elements of those sources (i.e. historical site activities, sources of contamination, chemical nature of the various sources, background conditions, etc.) needs to be compiled to adequately focus the site investigation.

It is also important to understand and define the release mechanism – in this case random distribution vs. wide-spread dumping – in order to properly design and implement an investigation. In assessing releases associated with wide-spread dumping, it might be sufficient to broadly characterize the nature and extent of the release area as a whole. In the case of a more random distribution, a more intensive investigation may be necessary in order to identify numerous, smaller, release areas that have the potential to impact human health (and property value). From the presentation



of data, it appears that although dumping occurred over a wide area, the distribution of MGP waste is not uniform and does not lend itself to generalized characterization.

- b) Applicable regulatory requirements have not been met: As discussed previously, the release area has not been adequately characterized, in nature or extent – a key component of Site Investigation implemented in accordance with the Remediation Regulations. Exceedances of Method 1 criteria have been documented and a Method 3 Risk Assessment proposed; however, until characterization of the site is complete, a compliance evaluation or calculation of alternative site-specific criteria is not appropriate. Moreover, it is the opinion of ENACT and Fuss & O'Neill that compliance with the RIDEM Method 1 criteria is the best approach to adequately protect the interests, including financial and health priorities, of the Bay Street area community.
- c) Appropriate consideration has not been given to the preferred remedial alternative: Section 7.04 of the Remediation Regulations requires that, in addition to outlining at least two remedial alternatives (other than no further action), each alternative must be supported by relevant data, and the preferred alternative must be identified. Sufficient data has been collected such that an evaluation of remedial alternatives could have been developed in the SSIR. The presentation of such alternatives would also help focus the investigation activities that still need to be completed. For instance, simply delineating the extent of fill and impacted soil would facilitate excavation of MGP waste over a wide area. Alternatively, if only small pockets of contaminated soil will be removed from the site, much more data will be needed to ensure that all contaminated soil requiring excavation is identified.

The Remediation Regulations also state that remedial alternatives must be supported by documentation of compliance with State and local laws and regulations or “other public concerns...”. Proper consideration has not been given to the impacts on human health, property values, and standard of living that result from not presenting remedial alternatives that address the concerns of the community and further understanding of the direction of investigations and clean-up.

3.0 METHOD 3 RISK ASSESSMENT APPROACH IS NOT APPROPRIATE

Fuss & O'Neill has reviewed the “Risk Assessment Work Plan for Conducting a Human Health Risk Assessment for the Bay Street Suspected Fill Area” prepared by ENVIRON. It is our opinion that a Method 3 Risk Assessment is not appropriate for this site, due in large part to NEGC's lack of control over the properties, which results in a wide array of unknowns associated with exposure pathways and management of risk. Some of the many factors that would have to be considered to implement a Method 3 Risk Assessment capable of evaluating compliance with RIDEM regulations are discussed below, along with specific comments that relate to the work plan:



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- a) Because NECG does not have control over the impacted properties and cannot restrict exposure to contaminated soil, a risk assessment at the site must assume that property owners, residents (including children), workers, and pets could be exposed to any soil across the site during any time of the year, for unlimited durations and unrestricted activities. Utility work, property improvements, and excavation activities all have the potential to expose residents and workers to contaminated soil below the surface, or bring deeper soil to the surface.
- b) Inhalation of particulates should be considered as an exposure pathway, particularly in association with exposure of impacted soil at depth during construction activities.
- c) Cumulative risk must be considered. All potential contaminants of concern (COC) need to be included in the risk assessment to effectively evaluate cumulative risk even if individual compounds do not exceed screening level concentrations. Furthermore, the work plan proposes that the assessment focus on the ten compounds presenting the greatest risk. Conversely, all potential carcinogenic or non-carcinogenic COCs identified should be included in cumulative risk calculations.
- d) Because of the inability to limit exposure and the many exposure pathways, potential chemicals of concern that are not commonly found on MGP sites should be evaluated in the risk assessment if the origin of the COC is unknown. In addition, background concentrations of COCs should be considered in the COC selection process and not eliminated and simply discussed in an “Uncertainty Section.”
- e) Total petroleum hydrocarbons (TPH) should not be dismissed as COCs even if individual compounds that are considered petroleum hydrocarbons are evaluated individually. TPH should be considered in the cumulative risk calculations.
- f) Organic carbon content should only be considered if there are an appropriate number of samples collected in all soil horizons.

Although a Method 3 Risk Assessment is presented by RIDEM as an optional method (subject to approval) for evaluating compliance with the Remediation Regulations, the variable and complex distribution of contaminants and NEGC's inability to restrict exposure to remaining contaminants render a Method 3 Risk Assessment inappropriate at this site. In addition, completion of a Method 3 Risk Assessment will not adequately address all the issues facing the community – such as declining property values resulting from the presence of contaminated soil.

4.0 DOCUMENTATION OF COMPLIANCE

The final outcome of the investigation and remediation of the site must be a “Letter(s) of Compliance” covering all properties within the site thus demonstrating compliance with the Remediation Regulations. Documentation of such compliance is necessary to:



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- ensure that no future action will be required of individual property owners because of the contamination present on their properties,
- protect the investments of property owners, and
- support financing associated with sale or refinancing of the properties.

Letters of “No Further Action” will not be sufficient as they do not demonstrate compliance and will not protect the interests of the individual property owners or the community.

5.0 SITE-WIDE APPROACH TO INVESTIGATION AND REMEDIATION

The SSIR groups 95 properties at the site into three categories:

- 76 properties for which a human health risk assessment is proposed,
- 13 properties for which a “No Further Action” letter will be requested, and
- 6 properties for which it will be recommended that RIDEM request access.

It is not appropriate to evaluate the site on a property-by-property basis. Property boundaries have no bearing on the distribution of MGP waste and appear to be an arbitrary demarcation to use in evaluating nature, extent, and compliance. Furthermore, as discussed previously, results presented in the SSIR focus primarily on portions of properties that do not lie within Town rights-of-way, and therefore do not adequately characterize the full degree and extent of potential exposure even on a given parcel. The final remedy must address risks on a site-wide basis in order to be protective of human health and community interests and must result in “Letters of Compliance” for all properties investigated as part of the site assessment.

6.0 CONCLUSIONS

Fuss & O'Neill and ENACT have concluded that the completion of additional response items are necessary protect the health and financial security of the residents of Tiverton. It is requested that the recommendations and concerns discussed herein be incorporated into forthcoming investigations, and that RIDEM require those response actions be implemented in an expedient fashion. In summary, the key issues that need to be addressed include:

- a) The nature and extent of the release area needs to be further characterized so that compliance with the Remediation Regulations and remedial alternatives can be assessed.
- b) The site investigation should be focused so that remedial alternatives will meet community goals and needs.
- c) Compliance with Method 1 criteria needs to be demonstrated and documentation of compliance with the Remediation Regulations in the form of “Letters of Compliance” for all properties must be the final outcome of investigation and remediation. A



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Method 3 Risk Assessment approach and letters of “No Further Action” will not be adequate in meeting the needs of the community.

- d) Investigation, remediation, and compliance evaluations need to be conducted using a site-wide approach, not on a property-by-property basis or based on municipal boundaries.

It is important that progress toward remediation and compliance be expedited and conducted in a manner that focuses on the issues facing the residents of the Bay Street area. If you have any questions or comments regarding this letter, please do not hesitate to call.

Sincerely,

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John A. Chambers, PG, LSP
Associate Hydrogeologist

cc: Ms. Gail Corvello, ENACT