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Subject: Second Supplemental Final Environmental Impact Report (SSFEIR)
Payne's Crossing
Assonet, MA

On behalf of the Assonet Bay Action Committee (ABAC), Geo-Hydro, Inc (GHI) has reviewed the SSFEIR for the proposed Payne's Crossing development. GHI's comments on the document are provided below.

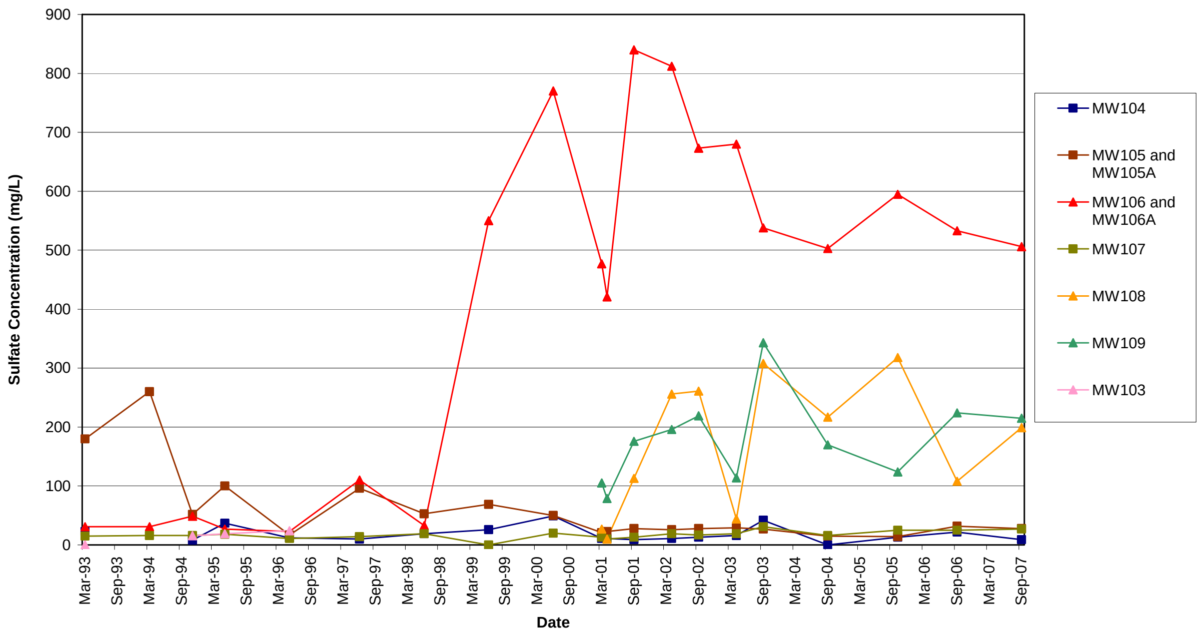
Section 3, Solid Waste Management

Page 54, Section 3.2 – The first line of this section continues the mischaracterization of coal ash as an inert material. This is incorrect. Not only does flyash leach contaminants into water, water can react with the ash to at least temporarily cause the ash to set-up in a manner reminiscent of plaster of Paris or wall plaster. Studies have also shown that over time, chemical reactions within flyash ash cause the mineral composition to evolve, a process called diagenesis (McCarthy, et al., 1999). Diagenesis occurs within flyash over periods of years as water penetrates and the flyash is hydrated. These properties of flyash do not describe an inert material.

Page 54, Section 3.2 – This section describes the results of laboratory permeability testing on the coal ash disposed in the landfill. It states that the permeability of the Payne's Crossing fly ash is "*8.5 x10^{-5} and higher and thus demonstrates that the material is nearly impermeable*". In fact, a permeability of 8.5 x10^{-5} cm/sec is representative of that measured in silt or silty sands, hardly an impermeable barrier. The statement that permeability may be higher indicates that the material may be even more permeable than 8.5 x10^{-5}cm/sec. In addition, testing of long-term stability of landfilled coal combustion wastes has shown that where moisture is available during or after disposal, diagenesis of the wastes causes reduced strength and increased permeability after only a few years in the natural environment (McCarthy, et al., 1997). Permeability of the disposed flyash may be significantly higher now that it has had time for diagenesis to progress.

Page 55, Section 3.3 – The description of historical groundwater monitoring indicates that the facility is not having any significant effect on the underlying groundwater table. This characterization misleads the reader by limiting the evaluation only to the last few years of monitoring. When groundwater quality data from the early years on monitoring are compared to current groundwater quality, it is apparent that there have been large increases in indicator parameter concentrations since the landfill was placed.   The attached graph (Figure 1) shows the concentrations of sulfate (an indicator of fly ash contamination) in site monitoring wells from 1993 thru 2007. Prior to 1997 sulfate in MW 106 and 106A was well below 100 mg/l, after 1998 the concentration has ranged from 421 to 840 mg/l.   The suggestion that placement of waste in the landfill has not increased the concentration of contaminants in the groundwater is incorrect and misleading.

Figure 1
Sulfate in Groundwater



Section 4, Land Alteration

Page 57, Section 4.0 – The fourth paragraph of this section states that, "Coal ash is not a hazardous waste". It is correct that fly ash has been exempted from regulation as a hazardous waste. However, exemption of fly ash from regulation as a hazardous waste was a political compromise reached with waste generators to exempt fly ash from regulation as a hazardous waste under the Resource Conservation and Recovery Act, not a determination based on physical or chemical properties. The fact that fly ash has been statutorily exempted from regulation as a "hazard waste" does not indicate that flyash has no chemical properties that impact human health and the environment.

Page 57, Section 4.0 – The fifth paragraph of this section again continues the mischaracterization of coal ash as an inert material. See the first comment on page 54, section 3.2

Page 58, Section 4.1 – The document contains many inconsistencies about the permeability of the placed waste. The third paragraph of this section describes the permeability as ranging from 8.7 x 10^{-7} cm/sec to 1.16 x 10^{-6} cm/sec. This range is one to two orders of magnitude lower than the 8.5 x10^{-5} cm/sec reported in Section 3.2 (See comment on page 54). A document from Mason Associates Environmental Services Inc., dated June 17, 1993, contained in Appendix D indicates that the average permeability of waste disposed in the fill was 8.7 x 10^{-5} cm/sec. It appears that there is general confusion and misunderstanding about the permeability of the disposed waste. Without a firm understanding of the permeability of the disposed waste, all characterizations of groundwater flow and infiltration through the waste contained in the document are highly dubious.

Appendix A, Response to Comments

Page A-1 36, ABAC-18 – The fact that boron and molybdenum are naturally occurring elements is irrelevant to the question of whether they should be included in the monitoring program. All of the metals that are included in the monitoring program are naturally occurring. Boron and molybdenum are metals that leach from fly ash and are often found in elevated concentrations in fly ash impacted groundwater. They each have human health and environmental impacts. The monitoring system at the Payne's Crossing site must test for the appropriate, waste-specific parameters in order to provide confidence that the extent environmental impacts are understood.

Page A-1 40, 4-2 – Our original comment indicated that is it unclear how the proponents arrived at their overly optimistic determination of 8.7x 10^{-7} cm/sec permeability in the disposed waste. The response to our comment provides a reference to laboratory test results that indicate an average permeability of 8.7x10^{-5}. This verifies that the permeability cited in previous documents as well as in various locations within the SSFEIR is understated by two orders of magnitude and again indicates a general lack of understanding of the permeability of the disposed wastes as originally placed. In the intervening time, that permeability may likely have increased.

Page A-1 119, 154-5 - Looking up the classical definition of diagenesis in the American Heritage Dictionary is irrelevant to diagenesis of coal combustion byproducts (CCB's) placed in landfills. The American Heritage Dictionary is not a reference commonly utilized by scientists to understand new scientific terms and their appropriate usage. The scientific literature describes diagenesis in these materials as "the combined physical, chemical, and mineralogical changes that occur in a CCB after disposal" (McCarthy, et al., 1997). Unlike the cementation and compaction hypothesized in the response to this comment, testing has shown that diagenesis associated with many CCBs reduced the strength of the material by up to 90% and increased the permeability by two orders of magnitude (ibid.). Unless additional periodic testing is conducted, we will not understand how the fly ash diagenesis has affected the materials in this landfill and reliance on permeability tests conducted soon after placement will be questionable.

Page A-1 120, 154-7 – The propensity for landfills to produce groundwater mounds and radial groundwater flow in humid environments is well established. The area inside the landfill is the only location that data on the leachate head and undiluted leachate chemistry can be collected. The idea that wells cannot be placed into the center of a landfill to monitor leachate elevation and chemistry is technically unfounded and incorrect. The assertion, however, is a means to avoid collecting this critical information. In reality, gas collection wells are routinely installed through landfill caps at sites all over the country. There is no reason that monitoring wells cannot similarly be installed safely within the landfill mass. I have personally been involved in several EPA-directed landfill investigations where installation of monitoring wells within the landfill mass has been required. As long as data documenting the leachate elevation and chemistry within the landfill is not collected, documents discussing this site can continue to pretend that groundwater conditions now are the same as they were before the fill was placed.

Page A-1 121, 154-10 – The response to this comment on the potential for tidal influence on downgradient monitoring well locations in essence says that the locations were selected because the design of the fill operation didn't leave enough room between the fill and the shore to put them anywhere else. It avoids the issue of the degree that tidal flushing may dilute the concentrations of contaminants detected in the wells. The response suggesting that putting the monitoring wells too close to the landfill will create a "false positive" situation is without merit. The chemistry of the groundwater at the toe of the landfill would be more representative of leachate-impacted groundwater quality as it leaves the landfill than is water collected further shoreward and potentially subjected to tidally influenced dilution. Concurrent tidal and groundwater elevation monitoring should be used to determine if tidal effects are evident in the wells near the shore. Without this type of testing the operator, Regulators and third parties cannot be sure if the water chemistry reported is more representative of groundwater or bay-water. See related comment on page 7, section 2 of the Baseline Risk Assessment, below.

Page A-1 122, 154-15 - Examination of only the last few years of monitoring data does not give show the entire impact of waste placement in the landfill and will mask what has actually happened over time. See the comment on page 55, Section 3.3 above.

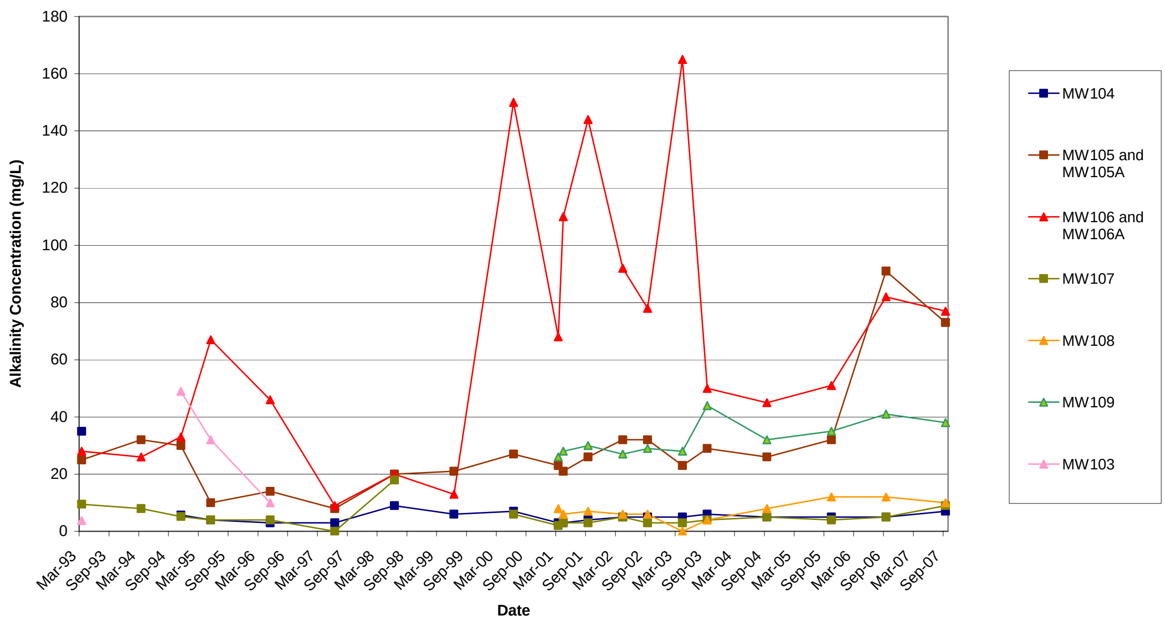
Appendix D - Baseline Risk Assessment

Page 3, Section 2.0 – The argument that the monitoring wells are placed to effectively characterize groundwater leaving the landfill because they were located as close as logistically possible to the berm is a non sequitur that attempts to justify the use of compromised monitoring data. In fact, the operator acknowledges the rational for the monitoring locations is the artifact of the design of the waste disposal site; the locations were not placed for purposes of adequate characterization. See comment on Page A-1 121, 154-10.

Page 3, Section 2.0 – The USGS Hydrologic Atlas of the Taunton River is not sufficiently detailed on the local scale to describe groundwater flow between the Payne's Crossing site and the bay. This paragraph attempts to describe groundwater flow direction and gradient on the basis of a 1990 survey and other undated surveys over the next decade without providing any site-specific water elevation data, or water table maps. Groundwater flow direction, as modified over the years by mounding beneath the landfill, is critical to understanding how contaminants move through the environment, to evaluating the effectiveness of the monitoring system, and to identifying where potential receptor populations may be located. The lack of this information in the baseline risk assessment makes suspect any identification of receptor locations made in this report. At a minimum, detailed water table maps, including data from beneath/within the landfill, should be prepared and included with the baseline risk assessment to allow meaningful determination of potential receptor areas.

Page 6, Section 2.0 – The discussion of alkalinity attempts to plant the idea that increased alkalinity caused by leaching from the landfill may in fact be desirable. In fact, alkalinity increases downgradient of the landfill indicate groundwater impact from the disposal area. Examination of alkalinity data from the Payne’s Crossing from 1993 –2006 (Figure 2) shows that the downgradient monitoring wells, MW105, MW106 and MW109 each contain alkalinity above the 10 mg/l background range identified in the risk assessment and appear to be on an increasing trend. While alkalinity itself is not a toxin, rising alkalinity can reflect a groundwater chemistry with increased capacity to mobilize other contaminants that are toxic.

Figure 2
Alkalinity in Groundwater



Page 7, Section 2.0 – The discussion of sulfate concentrations invokes tidal influence on the downgradient monitoring wells to explain high sulfate values detected in downgradient wells. We have raised this question previously (see previous comment on page A-1 121, 154-10). After dismissing the potential of compromised monitoring data due to tidal mixing, the applicant now states, in the risk assessment, that tidal influence may be sufficient to influence sulfate concentrations in downgradient monitoring wells. The Massachusetts Department of Environmental Protection should act to require the groundwater monitoring network to be completely revised to assure that high quality monitoring data, of known origin, are being generated.

Page 13, Section 3.3 - The Toxicity Characteristics Leaching Procedure (TCLP) is being misapplied in the Baseline Risk Assessment by implying that TCLP tests are an indicator of potential leachate chemistry. TCLP is the USEPA-prescribed laboratory testing protocol that is used to rank some solid wastes with respect to the potential toxicity of some constituents. It replaced the original extraction procedure (EP-TOX) for that purpose. The TCLP results are compared to a regulatory gateway to determine if a non-listed, non-exempt solid waste can be managed under Solid Waste (Subtitle D) regulations or if it must be managed under Hazardous Waste (Subtitle C) regulations. A variety of additional regulatory uses for the TCLP have evolved through practice and time. Generally these uses are predicated upon the perception that TCLP results below the regulatory gateway reflect potential real-world leachate composition or risks to human health and the environment. That perception is not supported by critical review or a scientific demonstration of efficacy.

The TCLP test was not designed to predict the concentration of any contaminant in the waste leachate that will form under disposal conditions. It was not represented as a protocol capable of doing so. And, the inadequacy of this and similar index tests to predict field compositions has been increasingly obvious for the last two decades as more and more regulatory programs have attempted to use them as surrogates for or predictors of field leachates from waste placement.

The Science Advisory Board (SAB) for the USEPA has recognized and expressed the inadequacies of these tests since at least 1991 and in 1999 called for a review of agency procedures (USEPA, 1999). The USEPA funded research by the SAB to study the best methods for modeling the impacts of waste disposal on groundwater in terms of risks to human health and the environment. That report was issued in 2004. One of the elements of that study was yet more evaluation of why tests like the TCLP cannot be used for the purpose of predicting field leachates (Al-Abed, 2003). The SAB report (USEPA, 2004) documents that as long ago as the mid-1980s it was recognized that field observation and computer modeling were required to predict how leachates would evolve.

The National Research Council echoed the warning of the inadequacy of laboratory characterization tests as surrogates for determining field leachate composition specifically with respect to CCBs in their investigation of coal combustion ash disposal in mined settings (NRC, 2006, pp 145-152). The USEPA, in its recently released-for-comment draft risk assessment of landfills and lagoons used for disposal of coal combustion wastes, ranked potential sources of data relative to their value as indicators of real-world leachate composition. TCLP and similar index tests ranked fourth among the four available data types (RTI, 2007).

Page 23, Section 3.4 – The discussion of the selenium EPC for well MW106 indicates that the EPC of 0.19 mg/l poses no significant risk even though the EPC is nearly twice the MCP standard of 0.1 mg/l. Exceeding the MCP by nearly a factor of 2 is sufficient to require a site-specific Method 3 evaluation beyond the stage 1 screening. Re-evaluation of fly ash related risks should be revisited after the monitoring well network has been evaluated to eliminate potential tidal flushing of contaminants from the groundwater.

References

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These comments were prepared on behalf of the Assonet Bay Action Committee. Please feel free to contact me at (303) 948-1417 or at mhutson@geo-hydro.com with any questions or comments on this document.

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