



Engineers ♦ Environmental Scientists ♦ Surveyors

February 9, 2016

Ms. Julie Churchill  
Maine Department of Environmental Protection  
Regulatory Assistance Small Business Ombudsman  
17 State House Station  
Augusta, Maine 04333-0017

**Re: Keith Bowden | Critical Analysis of Fiberight, LLC & MRC Project | DEP# S-022458-WK-A-N**

Dear Ms. Churchill:

As requested in your email on February 2, 2016, Fiberight, LLC is providing the attached clarifications to issues raised by Mr. Keith Bowden, resident of Orrington. Fiberight's response is to address the letter and attached document entitled "Critical Analysis of Errors & Omissions found in MRC/Fiberight Solid Waste Permit Application on Hampden Project and Recent Deliverables from CES, Inc." that was submitted to the Maine Department of Environmental Protection (MDEP) on February 1, 2016.

The attached document presents Fiberight's response to Mr. Bowden's cover letter and the specific issues discussed within his critical analysis.

If you have any questions regarding the attached document, please do not hesitate to contact us.

Sincerely,  
CES, Inc.

A handwritten signature in blue ink, appearing to read 'K. Sullivan'.

Kyle Sullivan  
Senior Project Scientist

A handwritten signature in blue ink, appearing to read 'D. St. Peter'.

Denis St. Peter, P.E.  
Senior Project Manager

KSS/DSP/jok  
Attachment

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Fiberight, LLC and MRC (the applicants) question the validity of Mr. Bowden's critical analysis for the following reasons:

- ◆ Mr. Bowden references sections of the application pointing out that the information provided is inconsistent; however, it surprisingly appears that he has not recognized and taken into account that much of what is being identified as inconsistent information is merely the difference between updated information posted versus the original information that was posted. It also appears that Mr. Bowden has made some confusing statements regarding the Fiberight process as readily evidenced by (1) the disconnect between his statements in Section 1 of his critical analysis that seems to imply that sugars are the major plant output, downplaying the actual process pathway of anaerobic digestion, relative to his Section 8 where he claims that anaerobic digestion is "the most critical part of the Fiberight process" and (2) where he fails to recognize the use of continuous pulping in the applicants submission.
- ◆ The applicants have, on numerous occasions, engaged with Mr. Bowden and offered direct communication to include meetings with Fiberight engineers to resolve any questions he may have which if accepted, may have also provided sufficient information to avoid some of the confusion apparent in his analysis. The applicant had also communicated intent to listen to Mr. Bowden regarding any valid comments or suggestions that could potentially be included in final design of the plant, but he has also failed to take Fiberight up on their offer.

Please see the clarifications provided by Fiberight below each of Mr. Bowden's points.

1. **Mr. Bowden's Comment:** *The Maine DEP published a dozen Process Flow Diagrams (PFD's) of the Fiberight facility process design on their website on Dec. 21, 2015. In the Solid Waste Permit submitted in June 2015 there are nearly 2 dozen references to biomass fuel (industrial sugar), liquid sugar, sugar solutions, and cellulosic sugars. Nowhere in any of the permit applications is there a definition of "Industrial Sugars" or an indication of what concentrations of sugar that the facility will achieve/target, and basically what the technical specifications or requirements are for industrial applications. A careful reading of the permit application does indicate that sugar solutions may be 5 to 7% sugar and thus 93-95% water, salts, chemical inhibitors, and other components. But no viable market exists that I know of, for such shipments of water over any distance to another company.*

*The permit application states at the bottom of page 2 of Attachment 13 that "The exact disposition of the filtered hydrolysate is dependent on current contractual, market and operational conditions". The whole issue of sugar production is not one that is only a marketing one, but is technical and as such this reviewer believes that the contradictory statements in the permit application need to be clarified at this stage of the permit review process*

*To produce marketable, industrial sugars for "disposition", a facility must have the **installed equipment to make it, clean it of contaminants, concentrated the sugars to remove***

*the significant amounts of water, and then store the sugars for sale. There are a couple of occasions in the solid waste permit that mentions ways to concentrate sugars using either a membrane system or evaporation methods. There are also a couple times where it is noted that sugars not converted to natural gas via anaerobic digestion will be stored in multiple tanks. There are **no occasions** in the permit application that I have reviewed where the sugars are cleaned of salts, inhibiting organic acids are removed and a viable industrial/commercial sugar product is produced.*

*In Attachment 13, CES makes a number of seemingly contradictory statements about sugars. First, Page 1 - Products and Waste Generated: Lines 2-6, “The resultant products ...which **will** (emphasis added) be sold on the open commodities market ... and biomass fuel (sugar) which **will** (emphasis added) be sold on the open commodities market”. On the very next page 2 under the heading **Methods Utilized to Store Products**, the subheading Biomass fuel (Industrial Sugar), (concentrated in membrane systems or evaporators?), will be stored ... to be shipped and sold as industrial sugar **or** (emphasis added) the filtered hydrolysate is fed to the anaerobic digestion plant for conversion to biogas”.*

*Later in Attachment 13, in the section titled “05-Maine Process Description 15” on page 4-5 there are references now made to PDF 6: Enzyme Hydrolysis. Fiberight discusses how the enzyme converts the Activated Cellulose Substrate to clean sugars that are sent to the: “TK-6500 Sugar Break Tank. The filtered hydrolysate stored in TK-6500 is then either further concentrated in a membrane system and stored in a series of Sugar Storage Tanks to be shipped and sold as industrial sugar...” and adds the **or** sent to AD for conversion to gas. So the text cites an ability to concentrate sugars and store it in multiple tanks, yet PDF 6 and the General Arrangement Diagram (website supplemental of Dec. 10, 2015) does not show any membrane system or evaporation capability needed to concentrate sugars or any place to store concentrated sugars in multiple tanks. There is a clear contradiction between the written narrative in the permit application, here and also in Attachment 23 and the PFD # 6 that show only a Sugar Break tank, and no following Sugar Storage Tanks.*

**Fiberight Clarification:** The initial design and operation of the Hampden Facility does not contemplate the sale of industrial sugars. Rather the design basis calls for dilute sugars extracted from filtered hydrolysate to be introduced to the anaerobic digestion system to produce biogas which will be further processed to produce bio-methane. There is space allocated in the plant footprint to add a future sugar concentration system and storage tanks that will be required to process, concentrate and store the sugar solution as necessary to enable it to be sold as industrial sugar, should the applicant choose to pursue this process pathway in the future, and subject to relevant permit modifications (if any). The future system has not been shown on either the PFD's or the General Arrangement drawings as not to confuse the initial design/operation with a future operating mode.

- 2. Mr. Bowden's Comment:** *PFD 3A Secondary Sort Part A shows the hood, cyclone and blower system designed to remove thin plastic film from the 2D Fraction QC line in the solid waste processing room. The blower is shown directing the hood vapors to a filter and **vented to the atmosphere**. This emission point should be depicted as being directed to the odor control system. The neighborhood air quality in Hampden would be seriously impacted from these odor discharges as proposed/depicted discharging to the atmosphere.*

**Fiberight Clarification:** The vacuum system to be incorporated into the Hampden Facility utilizes a re-circulating air system such that the majority of the air utilized is re-circulated within the system. A slip stream of air will be directed to a filter and subsequently exhausted into the building which will be subjected to the same negative air pressure environment as the balance of the MSW processing area and as such, any odors that would be entrained in that air stream will be directed to the odor control system. Moreover, since the plastic films will have already been through the continuous pulper, it will be substantially free of organic material and would in any event, not significantly add to any odor generation.

- 3. Mr. Bowden's Comment:** *The U Maine FBRI report in the Solid Waste permit- Attachment 13 - Appendix B notes the autoclave temperatures operated at the Virginia pilot plant facility can cause issues of melting of plastics and the facilities plan to lower operating temperatures in the autoclave. The autoclave or rotary drum pulping unit (based on the more recent PFD's issued) are thus guaranteed to be producing vapors from melting waxes/plastics or other Volatile Organic Compounds. Have these potential emissions been **quantified** anywhere in the various permit applications (even though they are in the initial Processing Room where such vapors will be picked up in the hood system for subsequent scrubbing)?*

**Fiberight Clarification:** Fiberight is well aware of the issues associated with processing sorted MSW at high temperatures in an autoclave from both its work in the Virginia demonstration plant as well as working with Graphite Resources in the UK. An autoclave was originally installed in the Virginia demonstration facility to allow Fiberight to test the processing of the sorted MSW at a wide range of conditions. As a result of this exhaustive testing, the continuous rotary pulping units selected to be installed in the Hampden facility are operating at atmospheric pressure and are thereby limited in operating temperature. As such, the concern surrounding the melting of plastics and the resultant production of vapors and VOC's as stated above is unwarranted.

- 4. Mr. Bowden's Comment:** *In Attachment 13, starting on page 9, CES presents 2011 data collected by the University Of Maine School Of Economics with projections of the sources of 20% of incoming residuals that will have to be landfilled in Maine. A table categorizes material 2" or less in size and states 1% will be household hazardous waste (HHW) materials. (HHW includes paint, batteries, CFL & other fluorescents, light ballasts; even small propane cylinders will be in that residue). On page 16, Tables 19 and 20 list the*

various HHW sources and restates the origin of the 1% residue figure. But CES deliverable #13, the “MSW Mass Balance – Hampden Maine” table that breaks down the 652 tons per day of MSW going to the Fiberight facility ignores 6.52 tons per day of HHW since the table shows 0.00% in the “Aggregate Total” column. Which is it? And where on the General Diagram is Fiberight going to safely store, manage these nearly 7 tons per day of HHW residues as implied by the DEP in Deliverable #12 – “storage location of waste residuals”.

**Fiberight Clarification:** Although the data provided by the University Of Maine School Of Economics predicts that 1% of the incoming MSW should be characterized as HHW, it is hopeful that through additional education of the waste generators that the HHW waste volumes will be minimal and collected separately as HHW, at least in the cities and larger towns. However, in recognition that there will most likely be a small percentage of HHW in the incoming MSW, the Fiberight process provides for multiple instances for these materials to be recovered prior to ending up in the residue. However, even if a small quantity of these materials do end up in the residue, because the Fiberight process is not as severe as other waste disposal options the materials would not be compromised as would be the case in an incinerator and can be properly and safely disposed of in a landfill.

5. **Mr. Bowden’s Comment:** *Solid Waste Permit Section 23 includes a “draft” Operations and Maintenance (O & M) manual. While we recognize it is still a draft, inconsistencies with other attachments need to be corrected. O & M page 6 says “Fiberight will not accept separated supplies of wood waste or process wood waste such that it will be marketed and sold as biomass wood fuel, mulch or alternative daily landfill cover.” Is this different from the 1% (6.5 tons per day) of the “Construction and Demolition” that CES states will be in residential loads of bagged wastes from small household remodeling and construction projects? (See page 13 of Attachment 13).*

*Fiberight is no longer burning wood waste that originally was to be fed to the boilers with the Post Hydrolysis Solids as stated at the end of paragraph 1, page 2 of Section B –General Operations of the draft O & M manual (and also stated repeatedly in the Air Emissions Permit). The quantity of wood waste calculated from the Air Permit was projected to be 24 tons per day of material.*

*Since this is now rightfully considered a “waste” and not a fuel additive, CES needs to identify in all areas of all permit applications that this tonnage of wastes is going to the Norridgewock landfill. Alternatively, Fiberight needs to apply for a beneficial use for this solid waste material and include it in the Solid Waste permit application process if it is somehow going to be marketed.*

**Fiberight Clarification:** C&D waste is specifically excluded as an acceptable waste pursuant to Fiberight’s agreement with MRC, yet it would appear that C&D wood waste may have been included in the Criner waste characterization survey used as the basis for mass balance assumptions. It is the applicant’s intent to separately store C&D waste on its tip floor if received, and transfer same to Norridgewock landfill. Once the applicant has

gathered sufficient data on the actual quantities of wood waste received in acceptable waste, it will seek the guidance of MDEP on how best to handle this material consistent with Maine's waste hierarchy. It would be anticipated that sufficient data would be gathered within 12 months of the plant commencing operations.

6. **Mr. Bowden's Comment:** *The Block Diagram – as Received Mass Balance deliverable that appeared on the DEP webpage on Dec. 14, 2015 shows the only effluent discharge occurring from the Anaerobic Digester Plant (Block 9, 10) and equals 1,098 gpm. Yet the Solid Waste Permit application, Attachment 26 indicates the combined sanitary and process wastewater is 1,500 gpm. On page 1 of Attachment 20 of the Solid Waste Permit Application submitted by CES, it indicates that the average daily flow of sanitary sewer discharges and process wastewater will be only 25 gpm (36,000 gallons per day). These various numbers do not reconcile.*

**Fiberight Clarification:** The Mass Balance information provided the MDEP has been updated to reflect the latest facility design information. The current expected average wastewater discharge will be 150,000 gallons per day. This stream is primarily made up of cooling tower blowdown, process water discharge (water system purge) and a small contribution from the sanitary sewer system. Fiberight and CES are working with the Bangor Sewer District to accept this stream.

7. **Mr. Bowden's Comment:** *What is the need for the cooling towers and air compressor units that suddenly appeared in the December "General Arrangement Diagram". Their use is apparently somewhat in doubt since PFD 20 shows this equipment as a "Hold". Have the need for cooling towers been thoroughly studied and are they being driven by the energy balance for the AD facility? The use of the cooling towers can have a significant visual impact on the neighborhood, and may have a safety impact on the trucks entering/leaving the Hampden facility. Given the project proximity to Interstate 95, it may have a safety impact given the fog, mist, freezing rain, etc that may emanate from cooling tower plumes? Is that the best location for the cooling tower?*

*What process stream is being cooled and what are the potential volatile organic chemical compounds that may be released if it is in direct contact with to process water? Will there be any chemical additives in this cooling water, such as biocides, water softeners, etc.?*

**Fiberight Clarification:** The cooling towers and air compressors were not shown on the early General Arrangements as the utility requirements were determined subsequent to that issuance. Cooling towers are required mainly as a requirement to cool the re-circulating cooling water used to condense the steam in surface condensers on the steam turbine generator exhausts. The cooling towers to be purchased will be equipped with mist/drift eliminators keeping the drift losses to a minimum. Also, with the prevailing wind direction relative to the cooling towers, any water vapor emanating from the cooling towers should not impact either Route 95 or the facility truck traffic.