



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

Office of the
Secretary

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Secretary's Order No.: 2018-W-0069

RE: Application of Dogfish Head Craft Brewery to amend its existing Agricultural Utilization Permit, State Permit Number AGU 1406-S-05, to include an additional land application site known as the Young Farm, located approximately 4 miles southwest of the Town of Milton in Sussex County, Delaware.

Date of Issuance: December 3, 2018

Effective Date: December 3, 2018

Under the authority vested in the Secretary of the Department of Natural Resources and Environmental Control ("Department" or "DNREC") pursuant to 7 *Del.C.* §§6003, 6004(b), 6006(4), and all other relevant statutory authority, the Department issues this Order, approving a permit to allow Dogfish Head Craft Brewery ("Dogfish," "Applicant") to amend its existing Agricultural Utilization Permit, State Permit Number AGU 1406-S-05 ("AGU Permit"), to include an additional land application site known as the Young Farm, consisting of approximately 25 acres, and located approximately four (4) miles southwest of the Town of Milton, Delaware ("Application"). The Applicant's existing AGU Permit is issued under Part V of 7 DE Admin. Code 7103, *Regulations Governing the Land Treatment of Waste*.

BACKGROUND AND FINDINGS OF FACT

The Application to amend Dogfish's current AGU Permit to include the additional land application site known as the Young Farm was initially received by the Department's Division of Water, Surface Water Discharges Section, on February 28, 2018. Thereafter, the Application was placed on public notice by the Department on March 11, 2018, to open the public comment period. During the public notice period, the Department received a request for a public hearing regarding this matter. The Department held its public hearing concerning this matter on May 29, 2018, which was attended not only by Department staff and representatives of the Applicant, but also by several individuals from the public, who offered comment regarding this matter for inclusion into the formal hearing record. Proper notice of the hearing was provided as required by law.

Following the public hearing of May 29, 2018, the Department's technical staff in the Division of Water, Surface Water Discharges Section, prepared a Technical Response Memorandum ("TRM") to (1) specifically address the public concerns raised at the time of the hearing; (2) provide a formal regulatory review of the Applicant's proposed project; and (3) offer the Department's conclusions and recommendations with regard to this pending Application for the benefit of the hearing record generated in this matter. This TRM was subsequently received from the Division of Water for inclusion into the hearing record by Hearing Officer Lisa A. Vest.

Thereafter, Hearing Officer Vest prepared her Hearing Officer's Report ("Report"), which attached the TRM referenced above, and expressly incorporated the same therein. Ms. Vest's Report set forth the procedural history, summarized and established the record of information ("Record") relied on in the Report, and provided findings of fact, reasons, and conclusions that recommend that the Department approve this Application, subject to the conditions set forth in the draft Permit. The Report also addressed the public comments received in this matter, and concluded that the same did not warrant the Department's denying this Application, or delaying the permit decision to receive additional information.

REASONS AND CONCLUSIONS

This application is for an amendment to Dogfish's current AGU Permit, to include an additional application site of approximately 25 acres of land known as the Young Farm, located approximately four miles southwest of the Town of Milton, Delaware. I find that the inclusion of the Young Farm as an additional land application site for Dogfish's brewery wastewater will require the Applicant to obtain an amendment to its existing AGU Permit. I further find that the aforementioned proposed amendment to its current AGU Permit is subject to Delaware's regulatory requirements as set forth under Part V of 7 DE Admin. Code 7103, *Regulations Governing the Land Treatment of Waste*.

The concerns voiced at the May 29, 2018 public hearing were made by John Austin and Andrea Green, who were both concerned about the water quality in Sussex County, in particular, the impact of wastewater application(s) potentially degrading the water quality of Slaughter Branch, and the Broadkill River as a whole. Specific concerns voiced at the hearing included (1) the exact amount of brewery wastewater to be land-applied by Dogfish on an annual basis (and whether the amounts set forth in the Application were accurate); (2) whether monitoring wells should be required of the Applicant prior to the permitting of land application at the Young Farm; (3) whether current DNREC regulations governing sludge application for agricultural purposes and onsite wastewater disposal are adequate; (4) whether the waterways to which Dogfish will ultimately be discharging its wastewater will be able to accept such loads; (5) whether the proposed land application of the brewery's wastewater is fully supported by the data set forth in Dogfish's Application; and (6) potential error with regard to the application rate cited in the phosphorus section on page 13 of the Application.

In addition to the above concerns, Ms. Green voiced concern over how the application of fertilizer onto agricultural land, combined with the geology and hydrology of the area, have resulted in high levels of nitrates in the groundwater in Sussex County, and that without actual monitoring data of wells and studies of similar sites demonstrating that wastewater application will not have a negative impact on groundwater, DNREC should deny all permits granting land application of wastewater. Furthermore, Ms. Green questioned whether a decision had already been made with regard to the amendment of Dogfish's existing AGU Permit prior to the public hearing of May 29, 2018.

Following the public hearing of May 29, 2018 (and in response to the concerns voiced by the public in this matter), the technical experts in the Department's Division of Water prepared a Technical Response Memorandum ("TRM") to (1) specifically address the public concerns raised at the time of the hearing; and (2) offer conclusions and recommendations with regard to this pending Application for the benefit of the hearing record generated in this matter. In its TRM, the Department fully addresses the public's concerns related to this Application.

With regard to concerns about the accuracy of the Applicant's stated amount of brewery wastewater to be land-applied on an annual basis (and whether the information set forth in the Application was correct), the Department provides a detailed explanation as to how the annual land application amounts have been calculated. It should be noted that the figures in Dogfish's Application were an approximation, and should not be construed as specific limits in the permitting process. Additionally, during certain inclement weather conditions, or when the application sites are too wet to utilize, the Applicant cannot apply brewery wastewater onto fields. Brewery wastewater application is limited by hydraulic loading on a weekly basis, and by the amount of plant available nitrogen applied to agronomic crops. During any given application year, it is the plant available nitrogen (and not a set quantity of brewery wastewater) that limits the amount of wastewater than can be land applied, as the nitrogen loading rate is reached only after a fraction of a year's worth of hydraulic load occurs. Thus, land application does not occur continually through the year on any given field. The volume of wastewater that Dogfish generates on an annual basis must be distributed in an amount that corresponds to hydraulic loading limits and crop uptake for any given field.

It should also be noted that Dogfish's production continues to grow. As a result, the Applicant will continue to produce more brewery wastewater, and the 35,000,000 gallons per year as quoted in the Application will continue to change. Dogfish's continued growth is also one of the reasons that this Applicant is seeking additional land by way of requesting the permitting of Young Farm for additional application of its brewery wastewater. While Dogfish's current application sites can theoretically handle over 35 million gallons of brewery wastewater, in 2017 the actual quantity of wastewater applied by Dogfish under its AGU Permit was 20.6 million gallons (approximately one-third of the brewery wastewater was hauled off-site for disposal). Brewery wastewater is a waste product, and by nature, its composition varies. Therefore, it is critical that Dogfish continue to regularly update its nutrient loading rates, as required by its AGU Permit.

With regard to both Mr. Austin and Ms. Green's comments that monitoring wells should be required of this Applicant prior to the permitting of Young Farm, the Department notes that its Regulations which govern the land application of brewery wastewater do not require groundwater monitoring wells at agricultural utilization sites. However, the Department has been working with permittees to incorporate monitoring well requirements into agricultural utilization permits at the time of such permit renewals when appropriate. As such, the Department notified the Applicant in an April 27, 2018 letter that for any application sites that Dogfish plans on utilizing after the renewal of its existing AGU Permit, groundwater monitoring wells must be installed in accordance with a Department approved plan, sampled, and the results submitted to the Department no later than March 4, 2019 (180 days prior to the expiration date of its existing AGU Permit). Since it is unclear as of yet whether Dogfish will seek to continue land application activities at Young Farm as part of its permit renewal, a monitoring well network is not being required at this time. However, should Dogfish intend to utilize Young Farm during its next permit term, a monitoring well network will be required prior to permit renewal. For any fields Dogfish will not utilize past August 31, 2019, its existing AGU Permit requires notification to the Department of this Applicant's intent to cease land application activities no later than March 4, 2019.

Comments were also received at the hearing suggesting that current DNREC regulations governing (1) the land application of sludge for agricultural purposes; and (2) onsite wastewater disposal are inadequate. In response, the Department notes that this present Application is specific to Dogfish's request to land apply brewery wastewater, in accordance with Part V of 7 DE Admin. Code 7103, *Regulations Governing the Land Treatment of Waste*. The land application of sewage sludge is governed by Part III(B) of 7 DE Admin. Code 7103, and onsite wastewater disposal is governed by 7 DE Admin. Code 7101, *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems*. Thus, concerns with the adequacy of these regulations are not germane to the subject matter of the hearing of May 29, 2018, as both these regulations are outside the scope of this Application.

Mr. Austin also voiced concern as to whether the stream to which Dogfish discharges its groundwater is able to accept that load. Further, Mr. Austin requested a moratorium on all new operation permits until such time as the Department revises its regulations and completes the "Broadkill River Watershed Pollution Control Strategy" ("PCS"). In response, the Department notes that the PCS, dated December 2012, does not contain regulatory requirements. Rather, the PCS provides guidance on strategies that can be implemented to reduce the potential impacts of various activities in the watershed on the Broadkill River. According to the PCS, "[t]he Department intends to review the Strategy in 10 years and update it if further actions are needed to improve water quality."

According to aerial imagery, traditional farming has been implemented at the Young Farm since sometime prior to 1937. If the proposed Young Farm application site is permitted for the agricultural utilization of brewery wastewater, then land application at that site would occur in accordance with a nutrient management plan, and the farm would be planted in a continuous grass crop that would encompass many best management practices listed in the PCS to reduce impacts of the farm operation on groundwater and surface water. If the Young Farm is not permitted for agricultural utilization of brewery wastewater, traditional farming will continue, which would have less best management practices from the PCS in place than the agricultural utilization activities listed in this Application.

Additional comments were made by Mr. Austin at the hearing with regard to how the data provided in the Application does not support Dogfish's stated utilization rates of organic matter in the waste, nor the percentage of the ammonium to be volatilized. The Department responded by stating that this Application makes no mention of "utilizing organic matter at 20%" as alleged by Mr. Austin. However, a fraction of the total quantity of organic nitrogen in a waste is mineralized as soil microbes break organic nitrogen down into plant available forms of nitrogen. The Application references the 20% mineralization rate for organic nitrogen for anaerobically digested wastes. As Dogfish's brewery wastewater is anaerobically digested, a 20% mineralization factor is listed in its Application. Additionally, surface applied ammonium undergoes volatilization (the loss of ammonium to the atmosphere), and thus a large portion of the ammonium in the brewery wastewater is not available for crop utilization.

The Department's TRM notes that both the mineralization and volatilization rates utilized by Dogfish for nutrient loading calculations in the Application are appropriate, and that the values are consistent with the regulatory requirements for such matters. Furthermore, according to analytical data from soils at the existing Dogfish application sites, the amount of plant available nitrogen (nitrate and ammonium) in the soil is consistently at levels deemed sufficient, and the data has never indicated that such levels are high. While these results are snapshots of the amount of plant available nitrogen in the soils at existing application sites, the Department also notes that the soil sample results have been consistent, and suggests that Dogfish's beneficial reuse of brewery wastewater by means of agricultural utilization is successful from a nutrient management perspective. Moreover, should the Department identify groundwater concerns that may be related to the over application of brewery wastewater in the future, the Department will take appropriate measures.

Mr. Austin also commented that the application rate cited in the phosphorus section on page 13 of the Application was incorrect. Upon further review, and in direct response to this comment, the Department discovered that Dogfish did, in fact, incorrectly state this rate. That error has now been corrected, and the Applicant's amended permit will contain language that requires application rates consistent with the Department's *Regulations* for both nitrogen and phosphorus.

Ms. Green also made many generalized comments at the hearing related to the state of groundwater in Sussex County, including (1) how application of fertilizer onto agricultural land combined with the geology and hydrology of the area result in high levels of nitrates in the groundwater; (2) that the drinking water in Sussex County places people at risk from nitrate contamination; and (3) without actual monitoring data of wells and studies of similar sites demonstrating that wastewater application will not have a negative impact on groundwater, DNREC should deny all permits allowing land application of wastewater. In response, the Department notes that comments presented regarding general concerns about Sussex County's groundwater quality, and of the potential impacts to groundwater from wastewater application are important, this Application is specific to the incorporation of the proposed Young Farm land in Dogfish's current AGU Permit for brewery wastewater agricultural utilization.

The Applicant's current AGU Permit contains many safeguards to help minimize potential impacts from the land application of brewery wastewater to the environment, primarily, by applying the wastewater at an agronomic rate for nitrogen. Dogfish's current AGU Permit limits the application of brewery wastewater, based on the plant available nitrogen in the wastewater, to no more than the amount of nitrogen necessary to generate optimum crop yields consistent with book values from the University of Delaware or the United States Department of Agriculture. Dogfish has indicated that the Young Farm may only be utilized until the expiration of its current AGU Permit (August 31, 2019) as a temporary application site, while Dogfish works toward permitting a large long term application site for the agricultural utilization of brewery wastewater. Should Dogfish seek to utilize the Young Farm past August 31, 2019, a network of groundwater monitoring wells would have to be installed, sampled, and monitored on a quarterly basis to monitor the successfulness of the Dogfish agricultural utilization program. If groundwater impacts from the application of brewery wastewater are identified, adjustments in the application program will occur as appropriate. Moreover, the safeguards as set forth in Dogfish's current AGU Permit will be implemented at the proposed Young Farm land application site, in addition to Dogfish's current land application sites.

Lastly, Ms. Green commented that she was somewhat taken aback by the Department's presentation offered at the hearing in this matter, noting that she was not sure whether the PowerPoint presentation given at that time was the Department's or the Applicant's. She also believed that the presentation indicated that a decision had already been made on the issuance of an agricultural utilization permit to Dogfish for the Young Farm application site. In response, the Department notes that the intention of the PowerPoint presentation given at the beginning of the public hearing was to inform the public about the contents of the Application, and about the program that governs the proposed permit amendment which was the subject of said hearing. The presentation contained the Department's logo on both the opening and closing slides, and Hearing Officer Vest introduced presenter Brian Churchill as the Department's representative. The Department referred to the facility during the presentation as the "proposed Young Farm application site," and it was also made clear that the Young Farm application site is proposed (not approved) in two Department legal notices leading up to the public hearing. Thus, appropriate measures were taken to inform the public that the public hearing of May 29, 2018 was being held by request, as provided for under 7 *Del.C.* Ch.60, and that a final permitting decision had not yet been rendered at that time.

The Department's experts in the Division of Water, Surface Water Discharges Section, have concluded that the proposed amendment to Dogfish's current AGU Permit to include an additional land application site known as the Young Farm complies with all state regulation requirements that govern such proposals, and have recommended issuance of said amended AGU Permit to the Applicant in this matter.

I find and conclude that the Applicant has adequately demonstrated its compliance with all requirements of the statutes and regulations, as noted herein, and that the record supports approval of the Application submitted by Dogfish Head Craft Brewery. Accordingly, this Order approves and directs that an amended AGU Permit, consistent with the record developed in this matter, be issued by the Department in the customary form, and with appropriate conditions.

Further, the Department concludes and directs the following:

1. The Department has jurisdiction under *7 Del. C.* §§6003, 6004, 6006(4), and all other relevant statutory authority, to make a final determination on the Application, after holding a public hearing and considering the public comments and all information contained in the Record generated in this matter;
2. The Department provided proper public notices of the Application submitted by Dogfish Head Craft Brewery, and of the public hearing held on May 29, 2018, and held said hearing in a manner required by the law and regulations;
3. The Department considered all timely and relevant public comments in the Record, as established in the Report, prior to issuing this Order as its final decision;
4. The Department has carefully considered the factors required to be weighed in issuing the Applicant's amended AGU Permit, and finds that the Record supports approval of the Application, and the issuance of the amended AGU Permit associated with same;
5. The Department shall issue an Amended AGU Permit (1406-S-05) to the Applicant for the inclusion of an additional land application site known as the Young Farm, consisting of approximately 25 acres, and located approximately 4 miles southwest of the Town of Milton, Delaware. Furthermore, said permit shall include all conditions as set forth in the Department's draft permit, to ensure that Delaware's environment and public health will be protected from harm;
6. The Department adopts the Report and its attachments as further support for this decision;
7. The Department has an adequate Record for its decision, and no further public hearing is appropriate or necessary; and

8. The Department shall serve and publish its Order on its internet site, and shall provide legal notice of the Order in the same manner that the Department provided legal notice of the Application.

Date

12/3/18


Shawn M. Garvin, Secretary
Department of Natural Resources and
Environmental Control

HEARING OFFICER'S REPORT

TO: The Honorable Shawn M. Garvin
Cabinet Secretary, Department of Natural Resources and Environmental Control

FROM: Lisa A. Vest *LAV*
Public Hearing Officer, Office of the Secretary
Department of Natural Resources and Environmental Control

RE: Application of Dogfish Head Craft Brewery to amend its existing State of Delaware Agricultural Utilization Permit (AGU 1406-S-05) to apply brewery wastewater onto an additional application site totaling approximately 25 acres, known as the Young Farm, located approximately four (4) miles southwest of the Town of Milton, Delaware.

DATE: November 26, 2018

I. BACKGROUND AND PROCEDURAL HISTORY:

A public hearing was held on Tuesday, May 29, 2018, at 6:00 p.m. by the Department of Natural Resources and Environmental Control (“DNREC,” “Department”) at the Milton Elementary School, located at 512 Federal Street, Milton, Delaware, to receive comment on the application of Dogfish Head Craft Brewery (“Dogfish,” “Applicant”) to amend its existing State of Delaware Agricultural Utilization Permit AGU 1406-S-05 (“AGU Permit”) to apply brewery wastewater onto an additional application site totaling approximately 25 acres, known as the Young Farm, located approximately four (4) miles southwest of the Town of Milton, Delaware (“Application”). The Applicant’s existing AGU Permit is issued under Part V of 7 DE Admin. Code 7103, *Regulations Governing the Land Treatment of Waste*.

The aforementioned Application was initially received by the Department’s Division of Water, Surface Water Discharges Section (“SWDS”), on February 28, 2018. Thereafter, the Application was placed on public notice by the Department on March 11, 2018. A request for a public hearing was received by the Department from Mr. John Austin on April 7, 2018.

On May 6, 2018, the Department placed its legal notice for the public hearing to be held in this matter in the News Journal, the Delaware State News, and on the Department's website. Accordingly, a public hearing concerning this matter was held on May 29, 2018, which was attended not only by Department staff and representatives of the Applicant, but also by several individuals from the public. Comment was received from the public at that hearing, and will be discussed in further detail below. Proper notice of the hearing was provided as required by law.

II. SUMMARY OF THE PUBLIC HEARING RECORD:

The public hearing record consists of the following documents: (1) a verbatim transcript; (2) eight documents representing the Department's Exhibits concerning this permitting matter, introduced by responsible Department staff at the public hearing held on May 29, 2018, and marked accordingly by this Hearing Officer as "Dept. Exh. 1-8"; (3) two sets of documentation provided by John Austin as a supplement to his verbal comment offered at the public hearing, marked as "Austin Exh. 1" and "Austin Exh. 2"; and (4) Technical Response Memorandum ("TRM") from Brian Churchill, Environmental Scientist, SWDS, through Bryan Ashby, Program Manager, SWDS, and Virgil Holmes, Director, Division of Water, dated October 24, 2018. The Department's person primarily responsible for reviewing this application, Mr. Churchill, as referenced above, developed the record with the relevant documents in the Department's files.

The hearing record generated in this matter indicates that the comments made during the public hearing were made by John Austin and Andrea Green, who were both concerned about the water quality in Sussex County, in particular, the impact of wastewater application(s) potentially degrading the water quality of Slaughter Branch, and the Broadkill River as a whole. Specific concerns voiced at the hearing included (1) the exact amount of brewery wastewater to be land-applied by Dogfish on an annual basis (and whether the amounts set forth in the Application

were accurate); (2) whether monitoring wells should be required of the Applicant prior to the permitting of land application at the Young Farm; (3) whether current DNREC regulations governing sludge application for agricultural purposes and onsite wastewater disposal are adequate; (4) whether the waterways to which Dogfish will ultimately be discharging its wastewater will be able to accept such loads; (5) whether the proposed land application of the brewery's wastewater is fully supported by the data set forth in Dogfish's Application; (6) potential error with regard to the application rate cited in the phosphorus section on page 13 of the Application; (7) how application of fertilizer onto agricultural land, combined with the geology and hydrology of the area, result in high levels of nitrates in the groundwater in Sussex County, and that without actual monitoring data of wells and studies of similar sites demonstrating that wastewater application will not have a negative impact on groundwater, DNREC should deny all permits granting land application of wastewater.

Following the public hearing of May 29, 2018 (and in response to the concerns voiced by the public in this matter), the technical experts in the Department's Division of Water prepared a Technical Response Memorandum ("TRM") to (1) specifically address the public concerns raised at the time of the hearing; and (2) offer conclusions and recommendations with regard to this pending Application for the benefit of the hearing record generated in this matter. In its TRM, the Department fully addresses the public's concerns related to this Application.

With regard to concerns about the accuracy of the Applicant's stated amount of brewery wastewater to be land-applied on an annual basis (and whether the information set forth in the Application was correct), the Department provides a detailed explanation as to how the annual land application amounts have been calculated. Mr. Churchill specifically notes that the figures in Dogfish's Application were an approximation, and should not be construed as specific limits

in the permitting process. Additionally, during certain inclement weather conditions, or when the application sites are too wet to utilize, the Applicant cannot apply brewery wastewater onto fields. Thus, there are times Dogfish applies wastewater less frequently than 6 days per week.

The Department further notes that brewery wastewater application is limited by hydraulic loading on a weekly basis, and by the amount of plant available nitrogen applied to agronomic crops. During any given application year, it is the plant available nitrogen (and not a set quantity of brewery wastewater) that limits the amount of wastewater than can be land applied, as the nitrogen loading rate is reached only after a fraction of a year's worth of hydraulic load occurs. Thus, land application does not occur continually through the year on any given field. The volume of wastewater that Dogfish generates on an annual basis must be distributed in an amount that corresponds to hydraulic loading limits and crop uptake for any given field.

It should also be noted that Dogfish's production continues to grow. As a result, the Applicant will continue to produce more brewery wastewater, and the 35,000,000 gallons per year as quoted in the Application will continue to change. Dogfish's continued growth is also one of the reasons that this Applicant is seeking additional land by way of requesting the permitting of Young Farm for additional application of its brewery wastewater.

Lastly, Mr. Churchill notes that, while Dogfish's current application sites can theoretically handle over 35 million gallons of brewery wastewater, in 2017 the actual quantity of wastewater applied by Dogfish under its AGU Permit was 20.6 million gallons (approximately one-third of the brewery wastewater was hauled off-site for disposal). Moreover, brewery wastewater is a waste product, and by nature, its composition varies. Therefore, it is critical that Dogfish continue to regularly update its nutrient loading rates, as required by its AGU Permit.

With regard to both Mr. Austin and Ms. Green's comments that monitoring wells should be required of this Applicant prior to the permitting of Young Farm, the Department notes that its Regulations which govern the land application of brewery wastewater do not require groundwater monitoring wells at agricultural utilization sites. However, the Department has been working with permittees to incorporate monitoring well requirements into agricultural utilization permits at the time of such permit renewals when appropriate. As such, the Department notified the Applicant in an April 27, 2018 letter that for any application sites that Dogfish plans on utilizing after the renewal of its existing AGU Permit, groundwater monitoring wells must be installed in accordance with a Department approved plan, sampled, and the results submitted to the Department no later than March 4, 2019 (180 days prior to the expiration date of its existing AGU Permit). Since it is unclear as of yet whether Dogfish will seek to continue land application activities at Young Farm as part of its permit renewal, a monitoring well network is not being required at this time. However, should Dogfish intend to utilize Young Farm during its next permit term, a monitoring well network will be required prior to permit renewal. For any fields Dogfish will not utilize past August 31, 2019, its existing AGU Permit requires notification to the Department of this Applicant's intent to cease land application activities no later than March 4, 2019.

Comments were also received at the hearing suggesting that current DNREC regulations governing (1) the land application of sludge for agricultural purposes; and (2) onsite wastewater disposal are inadequate. In response, the Department notes that this present Application is specific to Dogfish's request to land apply brewery wastewater, in accordance with Part V of 7 DE Admin. Code 7103, *Regulations Governing the Land Treatment of Waste*. The land application of sewage sludge is governed by Part III(B) of 7 DE Admin. Code 7103, and onsite

wastewater disposal is governed by 7 DE Admin. Code 7101, *Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems*, both of which are outside the scope of this Application.

Mr. Austin also voiced concern as to whether the stream to which Dogfish discharges its groundwater is able to accept that load. Further, Mr. Austin requested a moratorium on all new operation permits until such time as the Department revises its regulations and completes the “Broadkill River Watershed Pollution Control Strategy” (“PCS”). In response, Mr. Churchill notes that the PCS, dated December 2012, does not contain regulatory requirements. Rather, the PCS provides guidance on strategies that can be implemented to reduce the potential impacts of various activities in the watershed on the Broadkill River. According to the PCS, “[t]he Department intends to review the Strategy in 10 years and update it if further actions are needed to improve water quality.”

According to aerial imagery, traditional farming has been implemented at the Young Farm since sometime prior to 1937. If the proposed Young Farm application site is permitted for the agricultural utilization of brewery wastewater, Mr. Churchill notes that land application would occur in accordance with a nutrient management plan, and the farm would be planted in a continuous grass crop that would encompass many best management practices listed in the PCS to reduce impacts of the farm operation on groundwater and surface water. If the Young Farm is not permitted for agricultural utilization of brewery wastewater, traditional farming will continue, which would have less best management practices from the PCS in place than the agricultural utilization activities listed in this Application.

Additional comments were made by Mr. Austin at the hearing with regard to how the data provided in the Application does not support Dogfish's stated utilization rates of organic matter in the waste, nor the percentage of the ammonium to be volatilized. The Department responded by stating that this Application makes no mention of "utilizing organic matter at 20%" as alleged by Mr. Austin. However, a fraction of the total quantity of organic nitrogen in a waste is mineralized as soil microbes break organic nitrogen down into plant available forms of nitrogen. The Application references the 20% mineralization rate for organic nitrogen for anaerobically digested wastes. As Dogfish's brewery wastewater is anaerobically digested, a 20% mineralization factor is listed in its Application. Additionally, surface applied ammonium undergoes volatilization (the loss of ammonium to the atmosphere), and thus a large portion of the ammonium in the brewery wastewater is not available for crop utilization.

Mr. Churchill notes in the TRM that both the mineralization and volatilization rates utilized by Dogfish for nutrient loading calculations in the Application are appropriate, and that the values are consistent with the regulatory requirements for such matters. Furthermore, the Department notes that, according to analytical data from soils at the existing Dogfish application sites, the amount of plant available nitrogen (nitrate and ammonium) in the soil is consistently at levels deemed sufficient, and the data has never indicated that such levels are high. While these results are snapshots of the amount of plant available nitrogen in the soils at existing application sites, Mr. Churchill notes that the soil sample results have been consistent, and suggest Dogfish's beneficial reuse of brewery wastewater by means of agricultural utilization is successful from a nutrient management perspective. Moreover, should the Department identify groundwater concerns that may be related to the over application of brewery wastewater in the future, the Department will take appropriate measures.

Mr. Austin also commented that he did not believe the application rate cited in the phosphorus section on page 13 of the Application was correct. Upon further review in direct response to this comment, the Department found that Dogfish did, in fact, incorrectly state this rate. That error has now been corrected, and, if granted, the Applicant's amended permit will contain language that requires application rates consistent with the Department's *Regulations* for both nitrogen and phosphorus.

Ms. Green made many generalized comments at the hearing related to the state of groundwater in Sussex County, including (1) how application of fertilizer onto agricultural land combined with the geology and hydrology of the area result in high levels of nitrates in the groundwater; (2) that the drinking water in Sussex County places people at risk from nitrate contamination; and (3) without actual monitoring data of wells and studies of similar sites demonstrating that wastewater application will not have a negative impact on groundwater, DNREC should deny all permits allowing land application of wastewater. In response, the Department notes that it is appreciative of the comments presented with regard to concerns about Sussex County's groundwater quality and of the potential impacts to groundwater from wastewater application. However, this Application is specific to the incorporation of the proposed Young Farm land application side in Dogfish's current AGU Permit for brewery wastewater agricultural utilization.

The Applicant's current AGU Permit contains many safeguards to help minimize potential impacts from the land application of brewery wastewater to the environment, primarily, by applying the wastewater at an agronomic rate for nitrogen. Dogfish's current AGU Permit limits the application of brewery wastewater, based on the plant available nitrogen in the wastewater, to no more than the amount of nitrogen necessary to generate optimum crop yields

consistent with book values from the University of Delaware or the United States Department of Agriculture. If permitted, Dogfish has indicated that the Young Farm may only be utilized until the expiration of its current AGU Permit (August 31, 2019) as a temporary application site, while Dogfish works toward permitting a large long term application site for the agricultural utilization of brewery wastewater. Should Dogfish seek to utilize the Young Farm past August 31, 2019, a network of groundwater monitoring wells would have to be installed, sampled, and monitored on a quarterly basis to monitor the successfulness of the Dogfish agricultural utilization program. If groundwater impacts from the application of brewery wastewater are identified, adjustments in the application program will occur as appropriate. Should an amended permit be issued to Dogfish, the safeguards in its current AGU Permit would be implemented at the proposed Young Farm land application site, in addition to Dogfish's current land application sites.

Lastly, Ms. Green commented that she was somewhat taken aback by the Department's presentation offered at the hearing in this matter, noting that she was not sure whether the PowerPoint presentation given at that time was the Department's or the Applicant's. She also believed that the presentation indicated that a decision had already been made on the issuance of an agricultural utilization permit to Dogfish for the Young Farm application site. In response, the Department notes that the intention of the PowerPoint presentation given by Mr. Churchill at the beginning of the public hearing was to inform the public about the contents of the Application, and about the program that governs the proposed permit amendment which was the subject of said hearing. The presentation contained the Department's logo on both the opening and closing slides, and this Hearing Officer introduced presenter Brian Churchill as the Department's representative. The Department referred to the facility during the presentation as the "proposed Young Farm application site," and it was also made clear that the Young Farm

application site is proposed (not approved) in two Department legal notices leading up to the public hearing.

Additionally, this Hearing Officer indicated at the beginning of the hearing that “[w]e are here this evening to provide a platform for the public to offer comment regarding the Amended Permit Application for Agricultural Utilization of Wastewater for the Proposed Young Farm Application Site.” Then, at the conclusion of the hearing, this Hearing Officer stated, “[a]s I said at the beginning of tonight’s meeting, there is no decision that’s going to be made tonight, nor has a decision already been made. We were here tonight to provide the opportunity to offer comment. And the Secretary will review all comments, as well as the entire record, prior to his making a decision in this matter.” It is the Department’s opinion that appropriate measures were taken to inform the public that the public hearing of May 29, 2018 was being held by request, as provided for under 7 *Del.C.* Ch.60, and that a final permitting decision had not yet been rendered at that time.

I find that the Division of Water’s TRM offers a detailed review of all aspects of the Applicant’s additional proposed site (e.g., the Young Farm) for land application of its brewery wastewater, identifies all of the concerns raised at the public hearing of May 29, 2018, and responds to them in a balanced manner, accurately reflecting the information contained in the formal hearing record. Thus, the aforementioned TRM is attached hereto as Appendix “A” and expressly incorporated herein as such.

III. RECOMMENDED FINDINGS AND CONCLUSIONS:

This Application is for an amendment to Dogfish’s current AGU Permit, to include an additional application site of approximately 25 acres of land known as the Young Farm, located approximately four miles southwest of the Town of Milton, Delaware. I find that the inclusion

of the Young Farm as an additional land application site for Dogfish's brewery wastewater will require the Applicant to obtain an amendment to its existing AGU Permit. I further find that the aforementioned proposed amendment to its current AGU Permit is subject to Delaware's regulatory requirements as set forth under Part V of 7 DE Admin. Code 7103, *Regulations Governing the Land Treatment of Waste*.

The Department's experts in the Division of Water have concluded that the proposed amendment to Dogfish's current AGU Permit to include an additional land application site known as the Young Farm complies with all state regulation requirements that govern such proposals, and have recommended issuance of said amended AGU Permit to the Applicant in this matter.

I find and conclude that the Applicant has adequately demonstrated its compliance with all requirements of the statutes and regulations, as noted herein, and that the record supports approval of the Application submitted by Dogfish Head Craft Brewery. In conclusion, I recommend that an amended AGU Permit, consistent with the record developed in this matter, be issued by the Department in the customary form, and with appropriate conditions.

Further, I recommend the Secretary adopt the following findings and conclusions:

1. The Department has jurisdiction under 7 *Del. C.* §§6003, 6004, 6006(4), and all other relevant statutory authority, to make a final determination on the Application after holding a public hearing, considering the public comments, and all information contained in the Record generated in this matter;

2. The Department provided proper public notice of the Application submitted by Dogfish Head Craft Brewery, and of the public hearing held on May 29, 2018, and held said hearing to consider any public comment that may be offered on the Application, in a manner required by the law and regulations;
3. The Department considered all timely and relevant public comments in the Record, as established in the TRM provided by the Division of Water;
4. The Department has carefully considered the factors required to be weighed in issuing the Applicant's amended AGU Permit, and finds that the Record supports approval of the Application and the issuance of the amended AGU Permit associated with same;
5. The Department shall issue an Amended AGU Permit (1406-S-05) to the Applicant for the inclusion of an additional land application site known as the Young Farm, consisting of approximately 25 acres, and located approximately 4 miles southwest of the Town of Milton, Delaware. Furthermore, said permit shall include all conditions as set forth in the Department's draft permit, to ensure that Delaware's environment and public health will be protected from harm;
6. The Department has an adequate Record for its decision, and no further public hearing is appropriate or necessary; and
7. The Department shall serve and publish its Order on its internet site, and shall provide legal notice of the Order in the same manner that the Department provided legal notice of the Application.



LISA A. VEST
Public Hearing Officer

APPENDIX "A"



STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES &
 ENVIRONMENTAL CONTROL
DIVISION OF WATER
 89 KINGS HIGHWAY
 DOVER, DELAWARE 19901

Surface Water Discharges Section

Telephone: (302) 739-9946
 Facsimile: (302) 739-8369

MEMORANDUM

TO: Lisa Vest, Hearing Officer, Office of the Secretary

THROUGH: Virgil Holmes, Director *VH 10/24/18*
 Bryan A. Ashby, Program Manager *BA 10/24/18 For E.Ashby*

FROM: Brian Churchill, Environmental Scientist *BC 10/24/18*

RE: Technical Response Memorandum Regarding the May 29, 2018 Public Hearing on the Amended Permit Application for Dogfish Head Craft Brewery to Include an Additional Application Site Known as the Young Farm

DATE: October 24, 2018

This Technical Response Memorandum (TRM) was prepared at the request of the presiding hearing officer to assist in the completion of the Hearing Officer’s Report to the Secretary of the Department of Natural Resources and Environmental Control (Department) and the final decision on the amendment of an agricultural utilization permit, State Permit Number AGU 1406-S-05, for the addition of the proposed Young Farm application site.

On February 28, 2018, the Department’s Division of Water, Surface Water Discharges Section (SWDS), received an amended permit amendment application from Dogfish Head Craft Brewery (Dogfish Head) to amend an existing agricultural utilization permit under Part V. of 7 DE Admin. Code 7103, *The Regulations Governing the Land Treatment of Waste* (the Waste Regulations) requesting the addition of an area of land totaling approximately 25 acres known as the Young Farm. The Young Farm is located approximately 4 miles southwest of the Town of Milton.

On March 11, 2018 the Department placed a legal notice for the proposed Dogfish Head Young Farm permit amendment application in the News Journal, the Delaware State News, and on the Department’s website. A request for a public hearing from Mr. John Austin was received by the Department on April 7, 2018.

On May 6, 2018 the Department placed a legal notice for a public hearing for the Dogfish Head Young Farm permit amendment application in the News Journal, the Delaware State News, and on the Department's website.

On May 29, 2018 a public hearing was held at the Milton Elementary School located at 512 Federal Street in Milton, DE 19968. Two individuals opposing the proposed land application site attended the hearing, provided comment, and raised concerns related to the permit amendment application. This TRM will focus on addressing public comments and questions during the May 29, 2018 hearing that are directly related to Dogfish Head's Young Farm permit amendment application.

1) According to Mr. Austin (beginning on transcript page 13), Dogfish Head's permit application indicates that 125,000 gallons of brewery wastewater would be applied six days a week which would equal 39 million gallons per year, not the 35 million gallons per year of brewery wastewater figure listed in Dogfish Head's permit application. Also, Mr. Austin stated "in the calculations, the applicant used 36.3 million gallons per year".

While Dogfish Head's permit amendment application indicates brewery wastewater is applied 6 days a week (6 days X 52 weeks in a year X 125,000 gallons per day = 39,000,000 gallons applied per year), the figures in Dogfish Head's permit amendment application were an approximation and not utilized as specific limits in the permitting process. Page 9 of Dogfish Head's permit amendment application states up to 125,000 gallons per day of brewery wastewater is generated six days a week, not exactly 125,000 gallons are generated each day. Additionally, as noted in the permit amendment application, during certain inclement weather conditions Dogfish Head cannot apply brewery wastewater onto its land application fields and thus at times Dogfish Head applies wastewater less frequently than 6 days a week. Page 10 of Dogfish Head's permit amendment application specifically states, other disposal options "occur in times of inclement weather or when the application sites are too wet to utilize".

Brewery wastewater application is limited by hydraulic loading on a weekly basis and by the amount of plant available nitrogen applied to agronomic crops. As outlined in the permit amendment application, during an application year it is the plant available nitrogen and not a set quantity of brewery wastewater that limits the amount of wastewater that can be land applied as the nitrogen loading rate is reached only after a fraction of a year's worth of hydraulic load occurs (thus application does not occur continually through the year on a given field). Therefore, the volume of wastewater that Dogfish Head generates on an annual basis must be distributed in an amount that corresponds to hydraulic loading limits and crop uptake for a given field.

Dogfish Head's production continues to grow. Thus they continue to produce more brewery wastewater and the 35,000,000 gallon figure quoted in the permit amendment application will continue to change. Page 10 of the permit amendment application indicates that, "It is estimated that the total wastewater generated by the brewery operation may increase to 150,000 gallons per day within the next two years. This corresponds to an annual volume of 46 million gallons" (approximately). Dogfish Head's continued growth is one of the reasons that Dogfish Head is

seeking additional land by way of requesting the permitting of the Young Farm for the application of brewery wastewater. Dogfish Head's permit amendment application (page 10) states, "Additional increases in volume in the future will necessitate the location of additional land for continuation of Dogfish's land treatment requirements. Dogfish is constantly searching for disposal alternatives."

As for the 36.3 million gallon number Mr. Austin referenced in Dogfish Head's permit amendment application, this number is the approximate maximum quantity of brewery wastewater that could be agronomically applied onto the land currently permitted for Dogfish Head, which according to the permit amendment application totals 121 acres. Based on data in the permit amendment application, the application of 300,000 gallons per acre of brewery wastewater = 207 pound of plant available nitrogen (PAN) per acre. 207 pounds of PAN applied is less than 210 pounds per acre estimated crop uptake from Dogfish Head's land application farms listed throughout their permit amendment application. As approximately 300,000 gallons of brewery wastewater per acre would satisfy the agronomic rate of the crop, 300,000 gallons X 121 available acres = approximately 36.3 million gallons of wastewater would load all of the fields agronomically at a nitrogen loading rate.

Based on the 118 acre figure Mr. Austin presented during the hearing, approximately 35.4 million gallons of brewery wastewater could be applied onto the application farms. While their current application sites can theoretically handle over 35 million gallons of brewery wastewater, in 2017 the actual quantity of wastewater applied by Dogfish Head under State Permit Number AGU 1406-S-03 was 20.6 million gallons (approximately 1/3rd of the brewery wastewater was hauled off-site for disposal). It should also be noted that the brewery wastewater is a waste product and by nature its composition varies. Therefore, it is critical that Dogfish Head continues to regularly update its nutrient loading rates as required by State Permit Number AGU 1406-S-03 and it is necessary for Dogfish Head to have more land permitted for application of brewery wastewater than a calculated number based on existing brewery wastewater data.

2) Mr. Austin and Ms. Green indicated that monitoring wells should be required prior to the permitting of the Young Farm. (Austin beginning on transcript page 14 and Green beginning on transcript page 23)

Part V of the Department's *Guidance and Regulations Governing the Land Treatment of Wastes* (Waste Regulations) governs the land application of brewery wastewater. The Waste Regulations currently do not require groundwater monitoring wells at agricultural utilization sites. However, the Department has been working with permittees to incorporate monitoring well requirements into agricultural utilization permits upon permit renewals when appropriate. As such, the Department notified Dogfish Head in a April 27, 2018 letter (Attachment 1) that for any application sites that Dogfish Head plans on utilizing after the renewal of State Permit Number AGU 1406-S-05, groundwater monitoring wells must be installed in accordance with a Department approved plan, sampled, and the results shall be submitted to the Department no later than March 4, 2019 (180 days prior to the expiration date of State Permit Number AGU

1406-S-05). Dogfish Head requested the amendment of State Permit Number AGU 1406-S-05 for the inclusion of the Young Farm to allow additional brewery wastewater application acreage while one or more large permanent application sites are secured. Upon permit amendment and issuance, Dogfish Head would only be able to utilize the Young Farm application site until State Permit Number AGU 1406-S-05 expires (August 31, 2019) without renewing the permit for additional time. Since it is unclear as of yet whether Dogfish Head will seek to continue land application activities at Young Farm as part of its permit renewal, a monitoring well network is not being required at this time; however, if Dogfish intends to utilize Young Farm during its next permit term, a monitoring well network will be required prior to permit renewal. For any fields Dogfish Head will not utilize past August 31, 2019, State Permit Number AGU 1406-S-05 requires notification to the Department of Dogfish Head's intent to cease land application activities no later than March 4, 2019.

3) According to a May 30, 2018 Email from Mr. Austin to Ms. Lisa Vest, "It is evident that current DNREC regulations as applied to sludge applied for agricultural purposes and in the case of onsite wastewater disposal are inadequate".

This permit amendment application is specific to Dogfish Head's request to land apply brewery wastewater in accordance with Part V. of 7 DE Admin. Code 7103, *The Regulations Governing the Land Treatment of Waste*. Part III, B. of 7 DE Admin. Code 7103, *The Regulations Governing the Land Treatment of Waste* governs the land application of sewage sludge and 7 DE Admin. Code 7101, *Regulations Governing the Design, Installation and Operation of On-Site Wastewater Treatment and Disposal Systems* governs onsite wastewater disposal, both of which are outside the scope of this permit application. See number 2 above for additional information on groundwater monitoring.

4) Mr. Austin stated "can the stream that this facility will be ultimately discharging groundwater to be able to accept that load?" (beginning on transcript page 13) and in a May 30, 2018 Email from Mr. Austin to Ms. Lisa Vest, Mr. Austin stated "Until revision of the regulations and PCS's has been completed, a moratorium on all new operation permits is requested. Workshops engaging all interested parties need to be held."

The "Broadkill River Watershed Pollution Control Strategy" (PCS), dated December 2012 (Austin Exhibit #2) does not contain regulatory requirements. The PCS provides guidance on strategies that can be implemented to reduce the potential impacts of various activities in the watershed on the Broadkill River. According to the PCS, "The Department intends to review the Strategy in 10 years and update it if further actions are needed to improve water quality".

According to aerial imagery, traditional farming has been implemented at the Young Farm since sometime prior to 1937. If the proposed Young Farm application site is permitted for the agricultural utilization of brewery wastewater, application would occur in accordance with a nutrient management plan and the farm would be planted in a continuous grass crop that would encompass many best management practices listed in the PCS to reduce impacts of the farm

operation on groundwater and surface water. Table 7 (Exhibit 2) in the PCS lists the specific goals for the restoration of the Broadkill Watershed for agriculture. The specific goals include limiting pollutants to levels at or below the Total Maximum Daily Load (TMDL) values specified in Table 7. For “Agriculture Goals”, the goal is listed as “Maintain existing implementation rate”. The Young Farm application site is consistent with this goal. See item #2 in this TRM for additional information related to groundwater monitoring. If the Young Farm is not permitted for agricultural utilization of brewery wastewater, traditional farming will continue which would have less BMP’s from the PCS in place than the agricultural utilization activities listed in the Dogfish Head permit application.

5) Mr. Austin stated “The application says that the grass is going to utilize 20 percent of the organic matter” and 50 percent of the ammonium is to be volatilized. “There is no data supporting that. It’s just not supported at all in the application.” (transcript page 15)

Dogfish Head’s permit amendment application makes no mention of “utilizing organic matter at 20%”. However, a fraction of the total quantity of organic nitrogen in a waste is mineralized as soil microbes break organic nitrogen down into plant available forms of nitrogen. Dogfish Head’s permit amendment application references the 20% mineralization rate for organic nitrogen for anaerobically digested wastes. As Dogfish Head’s brewery wastewater is anaerobically digested, a 20% mineralization factor is listed in Dogfish Head’s permit amendment application.

Additionally, surface applied ammonium undergoes volatilization (the loss of ammonium to the atmosphere) thus a large portion of the ammonium in the brewery wastewater is not available for crop utilization.

Mineralization and volatilization rates utilized by Dogfish Head for nutrient loading calculations in the permit amendment application are appropriate and the values are consistent with requirements in Part III, B. of 7 DE Admin. Code 7103, *The Regulations Governing the Land Treatment of Wastes*.

According to analytical data from soils at the existing Dogfish Head brewery wastewater application sites (Attachment 2), the amount of plant available nitrogen (nitrate and ammonium) in the soil is consistently at levels deemed “sufficient” and the data has never indicated that the levels are “high”. While these results are snapshots of the amount of plant available nitrogen in the soils at existing application sites, the soil sample results have been consistent and suggest Dogfish Head’s beneficial reuse of brewery wastewater by means of agricultural utilization is successful from a nutrient management perspective. Please see #2 for information on future groundwater monitoring requirements at the Young Farm. If the Department identifies groundwater concerns that may be related to the over application of brewery wastewater in the future, the Department will take appropriate measures.

6. Mr. Austin stated (beginning on transcript page 15) in Dogfish Head’s permit application for phosphorus, “it’s given that 1,086,800 gallons per acre per year are applied. At the 121 acres that they use, that is a volume far greater than the application says they are going to be using. So that’s over 131 million, not 39 or 36” and “They also come up with 345 pounds per acre of phosphorous. That is an obviously wrong number. Because at 38 milligrams per liter of phosphorus in the waste, and 36.3 million gallons per year, that’s only 31.5 pounds per day.”

Upon further review, it was noted that the application rate cited in the phosphorus section on page 13 of the application was incorrect. The phosphorus language from Dogfish Head’s permit amendment application, referenced by Mr. Austin (page 13 in the third paragraph under “Proposed Application Rate”), incorrectly states that the “above application rate” was 1,086,800 gallons per acre per year. The application rate being referenced as the “above application rate” was actually the 300,000 gallon per acre loading rate used for nitrogen, which should also have been utilized for the phosphorus loading calculations, not 1,086,800 as incorrectly stated in the permit amendment application. Based on an application rate of approximately 300,000 gallons per acre ($36.3 \text{ million gallons} / 121 \text{ acres} = 300,000 \text{ gallons per acre}$), the phosphorus loading rate would be much lower than what was cited in Dogfish Head’s permit amendment application. Utilizing the 300,000 gallons per acre application rate, approximately 95 pounds of phosphorus per acre would be applied. The error has been corrected and Dogfish Head’s amended permit will contain language that requires application rates consistent with the Waste Regulations for both nitrogen and phosphorus.

It should be noted that phosphorus is regulated differently than nitrogen in State Permit Number AGU 1406-S-05. Nitrogen may only be applied at up to an agronomic rate as the over application of nitrogen will likely impact groundwater. However, unless the soil levels for phosphorus are excessively high and the Phosphorus Site Index for the application fields indicates the loss of phosphorus to the environment is greater than a “low risk”, phosphorus can be applied at a rate greater than an agronomic rate. Under the aforementioned conditions, phosphorus may be applied at a rate above the agronomic rate because phosphorus interacts in the environment differently than nitrogen. As a result, while phosphorus loading rates and the level of phosphorus in the soil at application sites are tracked and reported to the Department, unless required as outlined above, normally the phosphorus levels in the brewery wastewater do not limit the application rate.

7. Ms. Green made many generalized comments (beginning on transcript page 21) related to groundwater in Sussex County, how application of fertilizer onto agricultural land combined with the geology and hydrology of the area result in high levels of nitrates in the groundwater, many people’s drinking water in Sussex County are at risk from nitrate contamination, and without actual monitoring data of wells and studies of similar sites demonstrating that wastewater application will not have a negative impact on groundwater, DNREC should deny all permits granting application of wastewater. Additionally Mr. Austin indicated (transcript page 16) that he believes until there is a

documented way of showing that the impact of wastewater application is not degrading the water quality of Slaughter Branch and the Broadkill River as a whole, these applications should be halted.

The permit that is the subject of this permit amendment application is State Permit Number AGU 1406-S-05 for the land application of Dogfish Head brewery wastewater. This permit is issued under Part V of 7 DE Admin. Code 7103, *The Regulations Governing the Land Treatment of Waste*. The Department appreciates the comments presented on citizen concerns regarding Sussex County groundwater quality and potential impacts to groundwater from wastewater application. However, this permit amendment application is specific to the incorporation of the proposed Young Farm land application site in Dogfish Head's current land application permit for brewery wastewater agricultural utilization. Decisions on permit amendment or authorization are made on a permit-by-permit basis. The public can submit comment concerning any wastewater application activities for the Department's consideration during the application and renewal process for those activities.

State Permit Number AGU 1406-S-05 contains many safeguards to help minimize the potential impacts from the land application of brewery wastewater to the environment. The primary way of minimizing impacts to groundwater from the application of brewery wastewater is by applying the wastewater at an agronomic rate for nitrogen. State Permit Number AGU 1406-S-05 limits the application of brewery wastewater, based on the plant available nitrogen in the wastewater, to no more than the amount of nitrogen necessary to generate optimum crop yields consistent with book values from the University of Delaware or the United States Department of Agriculture. If permitted, Dogfish Head has indicated that the Young Farm may only be utilized until the expiration of State Permit Number AGU 1406-S-05 (August 31, 2019) as a temporary application site while Dogfish Head works towards permitting a large long term application site for the agricultural utilization of brewery wastewater. Should Dogfish Head seek to utilize the Young Farm past August 31, 2019, a network of groundwater monitoring wells would have to be installed, sampled and monitored on a quarterly basis to monitor the successfulness of the Dogfish Head agricultural utilization program. See item # 2 above for additional information on monitoring well requirements. If groundwater impacts from the application of brewery wastewater are identified, adjustments in the application program will occur as appropriate.

Upon issuance of an amended permit to Dogfish Head, safeguards in State Permit Number AGU 1406-S-05 (Attachment 3) would be implemented at the proposed Young Farm land application site in addition to Dogfish Head's current land application sites.

8. Ms. Green stated (transcript page 23) that she was somewhat taken aback by the Department's presentation, she was not sure whether DNREC was giving Dogfish's presentation or DNREC's presentation, she didn't know whose PowerPoint it was, and she believed the presentation indicated that a decision had already been made on the issuance of an agricultural utilization permit to Dogfish Head for the Young Farm application site.

The intention of the PowerPoint presentation given by the Department at the opening of a public hearing was to inform the public about the contents of the application and the program that governs the proposed permit amendment that is under review. The presentation contained the Department's logo on the opening and closing slides, and the Hearing Officer introduced the presenter, Brian Churchill, as the Department's representative. The Department referred to the facility during the presentation as the "proposed Young Farm application site". In addition, it was made clear that the Young Farm application site is proposed (not approved) in two Department legal notices leading up to the public hearing.

Furthermore, the Hearing Officer indicated at the beginning of the hearing that "We are here this evening to provide a platform for the public to offer comment regarding the Amended Permit Application for Agricultural Utilization of Wastewater for the Proposed Young Farm Application Site." And at the conclusion of the hearing the hearing officer stated, "As I said at the beginning of tonight's meeting, there is no decision that's going to be made tonight, nor has a decision already been made. We were here tonight to provide the opportunity to offer comment. And the Secretary will review all comments as well as the entire record prior to his making a decision in this matter".

It is the Department's opinion that appropriate measures were taken to inform the public that the public hearing was being held by the Department by request as provided for under 7 Del.C. Chapter 60 and that a final permitting decision had not yet been rendered at the time of the hearing.



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

Surface Water
Discharges Section

Telephone: (302) 739-9946
Facsimile: (302) 739-8369

April 27, 2018

Mr. Matt Eisenmann
Dogfish Head Craft Brewery
#6 Cannery Village Center
Milton, DE 19968

Re: Updated Groundwater Monitoring Well Installation Requirements

Dear Mr. Eisenmann:

The Department of Natural Resources and Environmental Control (Department) Surface Water Discharges Section (SWDS) issued State Permit Number AGU 1406-S-05 (permit) on September 1, 2014. In the schedule of compliance, the permit required that Dogfish Head Craft Brewery Head (Dogfish Head) submit a groundwater monitoring plan for the installation of a network of groundwater monitoring wells for all land application sites. Additionally, the permit required that upon Department approval of the plan, sampling of the network of groundwater monitoring wells would be required on a quarterly basis in accordance with requirements in Part 1, B.3 of the permit.

The Department received correspondence from Dogfish Head dated June 23, 2015 requesting deferment for the installation of groundwater monitoring wells proposed in Dogfish Head's February 27, 2015 groundwater monitoring plan at the Baker Farm and Spicer Farm. Deferment was requested as Dogfish Head had received notice that Dogfish Head would be unable to renew leases on the Baker and Spicer Farms and they would no longer be available for the land application of brewery wastewater. The Department approved Dogfish Head's deferment request in a July 20, 2015 letter. Dogfish Head continued to provide the Department with updates related to plans for the installation of groundwater monitoring wells and that uncertainties at the other remaining agricultural utilization sites, known as the Payton Farm, Sequoia Farm, and Burton Farm remained as Dogfish Head was unable to secure leases for these farms for periods of time greater than one year. During a January 18, 2017 meeting between the Department and Dogfish Head, it was indicated that the Sequoia Farm was the most likely application site to remain available to Dogfish Head for the application of brewery wastewater in the future. Due to the uncertainty of lease renewals for the Payton Farm and Burton Farm, the Department agreed with Dogfish Head that the investment of a network of groundwater monitoring wells at these two application sites was not practical at the time. However, the Department and Dogfish Head agreed that the installation of groundwater monitoring

wells, in accordance with Dogfish Head's groundwater monitoring well installation plan, would proceed at the Sequoia Farm.

Shortly after the Department's February 1, 2017 letter to Dogfish Head summarizing well installation requirements at the Sequoia Farm, Dogfish Head indicated that they were having unforeseen complications continuing the lease on the Sequoia Farm. Additionally, later in 2017, Dogfish Head indicated it was working towards obtaining one or more large brewery wastewater application sites for its' future disposal needs that would replace the fields currently permitted under State Permit Number AGU 1406-S-05. However, based on new information, it is the Department's understanding that Dogfish Head is planning on renewing State Permit Number AGU 1406-S-05 for one or more of the current land application sites.

Recently, Dogfish Head submitted a permit application for a proposed land application site known as the Young Farm. It is the Department's understanding that Dogfish Head requested the amendment of State Permit Number AGU 1406-S-05 to include the Young Farm to allow additional brewery wastewater application acreage while one or more larger permanent application sites were secured. However, it is possible that Dogfish Head will seek to have the Young Farm permitted for the land application of brewery wastewater beyond the expiration date of State Permit Number AGU 1406-S-05.

Please note that for any application sites that Dogfish Head plans on utilizing after the expiration of State Permit Number AGU 1406-S-05, groundwater monitoring wells must be installed in accordance with a Department approved plan, sampled, and the results shall be submitted to the Department no later than March 4, 2019 (180 days prior to the expiration date of State Permit Number AGU 1406-S-05). Additionally, please note that for permit renewal, State Permit Number AGU 1406-S-05 requires at least 180 days before the expiration date of the permit the submittal of a new permit application and revised project development report. For any fields Dogfish Head will not utilize past August 31, 2019, State Permit Number AGU 1406-S-05 requires notification to the Department of Dogfish Head's intent to cease land application activities. **Failure to meet the aforementioned permit renewal requirements will result in the expiration of State Permit Number AGU 1406-S-05 and the loss of current land application sites.**

Should you have any questions, please feel free to contact me at (302) 739-9946.

Sincerely,



Brian Churchill
Environmental Scientist
Surface Water Discharges Section

cc: Mr. Scott Strohmeier, P.G. - Groundwater Protection Branch (email)
Mr. Pete Prado, Dogfish Head Craft Brewery (email)
Ms. Michelle Townsend, Dogfish Head Craft Brewery (email)

Delaware's good nature depends on you!

Soils Test Results



Account No. : 546

Soil Analysis Report

**BAGLEY, BRUCE
420 COSDEN ROAD
BARCLAY**

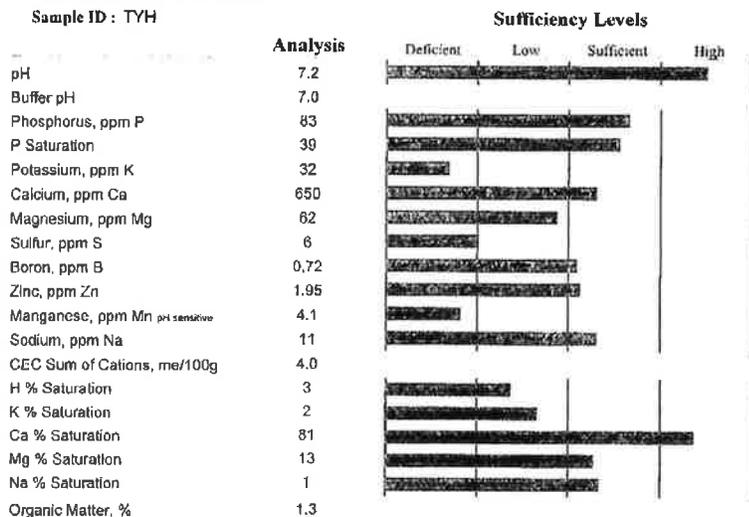
MD 21607

Invoice No. : 1102734
Date Received : 12/08/2017
Date Reported : 12/11/2017

Lab Number : 36259

Results For : DOG FISH HEAD
Location : SAND HILL ROAD
Sample ID : TYH

Extraction Method: Mehlich 3



Recommendations
In Actual Pounds of Plant Nutrients per Acre

Crop : (AgroLab) Cool Grass T/A										Nitrogen Credit : 0
Sub-Soils :										Yield Goal : 4
N	P2O5	K2O	S	Zn	Mg	Fe	Mn	Cu	B	Ag-Lime Tons/Acre
160	0	125	6	1	0		2		0.0	0.00

Reviewed By : W.R. Rohrer - AgroLab, Inc.

12/11/2017

Copy : 1

Page 1 of 4

Bus: 302-666-6094
Fax: 888-412-0873

web site
www.agrolab.us

101 Clukey Dr.
Harrington, DE 19952



Account No. : 546

Soil Analysis Report

**BAGLEY, BRUCE
420 COSDEN ROAD
BARCLAY**

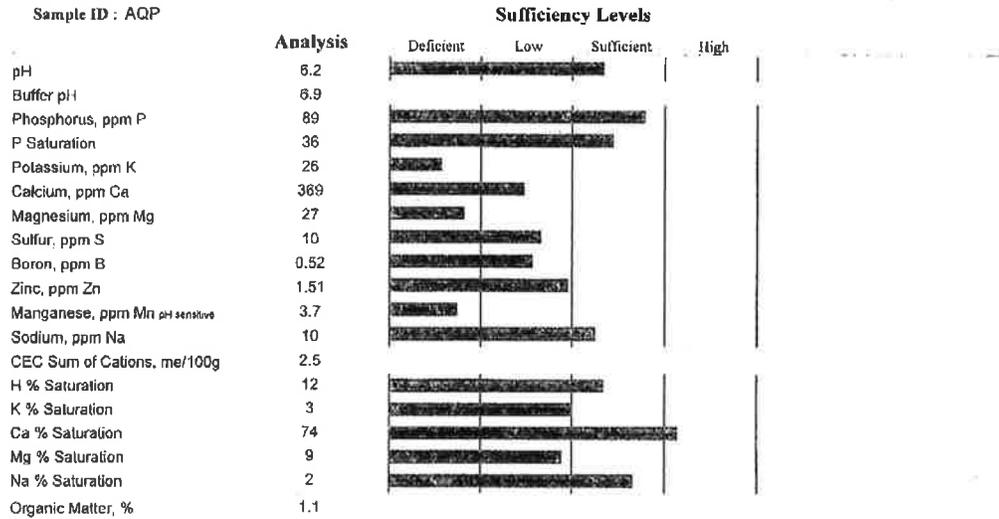
MD 21607

Invoice No. : 1102734
Date Received : 12/08/2017
Date Reported : 12/11/2017

Lab Number : 36260

Results For : DOG FISH HEAD
Location : SAND HILL ROAD
Sample ID : AQP

Extraction Method: Mehlich 3



Recommendations
In Actual Pounds of Plant Nutrients per Acre

Crop : (AgroLab) Cool Grass T/A										Nitrogen Credit : 0
Sub-Soils :										Yield Goal : 4
N	P2O5	K2O	S	Zn	Mg	Fe	Mn	Cu	B	Ag-Lime Tons/Acre
160	0	135	0	1	30		2		0.0	0.00

Reviewed By : W.R. Rohrer - AgroLab, Inc.

12/11/2017

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Page 2 of 4

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Account No. : 546

Soil Analysis Report

**BAGLEY, BRUCE
420 COSDEN ROAD
BARCLAY**

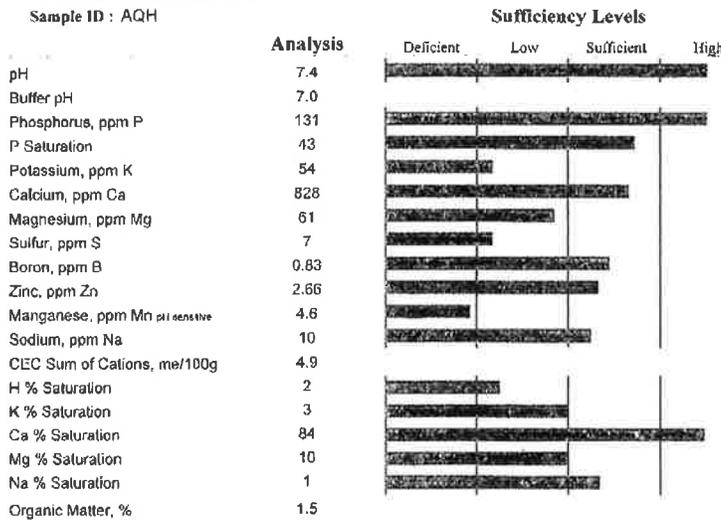
MD 21607

Invoice No. : 1102734
Date Received : 12/08/2017
Date Reported : 12/11/2017

Lab Number : 36261

Results For : DOG FISH HEAD
Location : SAND HILL ROAD
Sample ID : AQH

Extraction Method: Mehlich 3



Recommendations
In Actual Pounds of Plant Nutrients per Acre

Crop : (AgroLab) Cool Grass T/A										Nitrogen Credit : 0
Sub-Soils :										Yield Goal : 4
N	P2O5	K2O	S	Zn	Mg	Fe	Mn	Cu	B	Ag-Lime Tons/Acre
60	0	96	0	0	0		2		0.0	0.00

Reviewed By : W.R. Rohrer - AgroLab, Inc.

12/11/2017

Copy : 1

Page 3 of 4

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Harrington, DE 19952



Account No. : 546

Soil Analysis Report

**BAGLEY, BRUCE
420 COSDEN ROAD
BARCLAY**

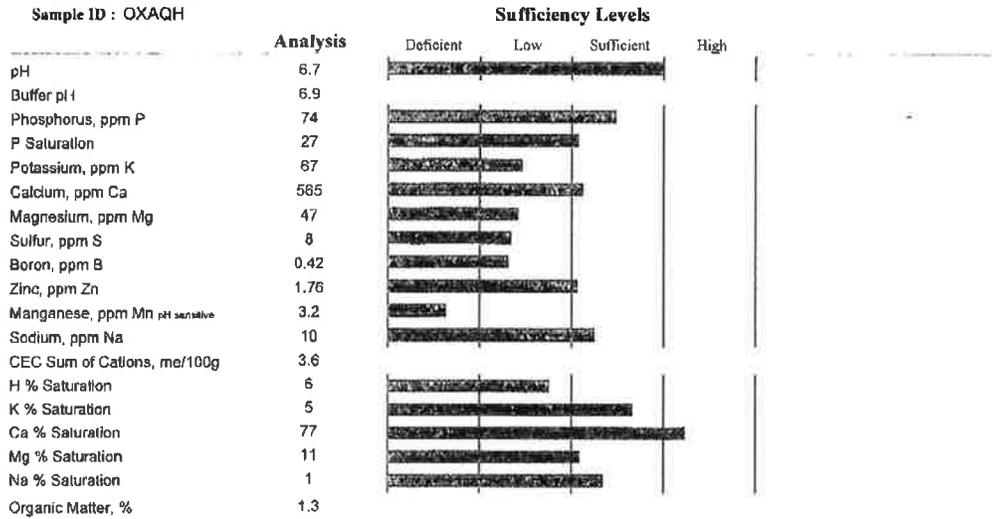
MD 21607

Invoice No. : 1102734
Date Received : 12/08/2017
Date Reported : 12/11/2017

Lab Number : 36262

Results For : DOG FISH HEAD
Location : SAND HILL ROAD
Sample ID : OXAQH

Extraction Method: Mehlich 3



Recommendations

In Actual Pounds of Plant Nutrients per Acre

Crop : (AgroLab) Cool Grass T/A										Nitrogen Credit : 0	
Sub-Soils :										Yield Goal : 4	
N	P2O5	K2O	S	Zn	Mg	Fe	Mn	Cu	B	Ag-Lime Tons/Acre	
160	0	80	0	1	10		2		0.0	0.00	

Reviewed By : W.R. Rohrer - AgroLab, Inc.

12/11/2017

Copy : 1

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Bus: 302-566-8094
Fax: 888-412-0873

web site
www.agrolab.us

101 Clukey Dr.
Harrington, DE 19952

Major Modification: Addition of the Young Farm, removal of the Baker Farm, adjustment of the application acerages of the Spicer Farm, additional buffer language, and the requirement to sample chloride in brewery wastewater and soil.
Pages effected: All

State Permit Number: AGU 1406-S-05
Effective Date: September 1, 2014
Expiration Date: August 31, 2019
Modification Date: October X, 2018



AUTHORIZATION TO OPERATE A LAND TREATMENT SYSTEM
FOR THE
AGRICULTURAL UTILIZATION OF WASTE

1. Pursuant to the provisions of 7 Del. C., §6003

Dogfish Head Craft Brewery
#6 Cannery Village Center
Milton, Delaware 19968

is hereby granted a permit to operate land treatment systems for brewery waste process water generated at the Milton Dogfish Head Craft Brewery facility. This permit is limited to the application of waste as stated above at agronomic rates to the sites designated in this permit.

2. The application rates, monitoring requirements and other permit conditions are set forth in Parts I, II and III hereof.

Bryan A Ashby, Program Manager
Surface Water Discharges Section
Division of Water
Department of Natural Resources
and Environmental Control

Date Signed

SITE LOCATIONS:

1. PAYTON FARM SITE DESCRIPTION:

This application site consists of approximately 21 acres of a 42 acre parcel of land located on the north side of Burton Road approximately 1 mile west of the intersection of State Road 30 and approximately 2.5 miles west of Milton, Delaware.

Tax parcel number: 2-35-19.00-10



*Without written Department approval, the application of brewery wastewater at the Payton Farm shall not occur when the daily prevailing wind is from the north or northwest.

2. BURTON FARM SITE DESCRIPTION:

The land application sites are part of an approximately 90 acre parcel of land. The land application areas of this parcel consist of approximately 15 acres (Burton Farm 1) of land and 16 acres (Burton Farm 2) and are located on the north side of Burton Road, approximately 1.5 miles west of State Road 30 and approximately 3 miles west of Milton, Delaware.

Tax parcel number: 2-35-19.00-4.00



* Without written Department approval, the application of brewery wastewater at Burton Farm 2 shall not occur when the prevailing wind is from the northeast. Application onto Burton Farm 1 has no wind direction limitations.

3. SEQUOIA FARM SITE DESCRIPTION:

The land application site is part of an approximately 55 acre parcel of land. The land application areas of this parcel consist of approximately 28 acres and is located on the north side of Delaware State Route 16 (Milton Ellendale Highway) between Sawmill Road and Spicer Road, approximately 2 miles west of State Road 30 and approximately 4 miles west of Milton, Delaware.

Tax parcel number: 2-35-13.00-3.02



* Without written Department approval, the application of brewery wastewater at the Sequoia Farm shall not occur when the daily prevailing wind is from the northeast.

4. SPICER FARM SITE DESCRIPTION:

The land application site is part of an approximately 41 acre parcel of land. The land application area of this parcel consist of approximately 10 acres and is located on the south side of Delaware State Route 16 (Milton Ellendale Highway) the west side of Spicer Road and approximately 5.5 miles northwest of Milton, Delaware.

Tax parcel number: 2-30-27.00-70.00



* Without written Department approval, the application of brewery wastewater at the Spicer Farm shall not occur when the daily prevailing wind is from the west, northwest, or southwest.

5. YOUNG FARM SITE DESCRIPTION:

The land application site is part of an approximately 44 acre parcel of land. The land application areas of this parcel consist of approximately 19 acres and is located on the west side of Sand Hill Road approximately 4 miles southwest of Milton, Delaware.

Tax parcel number: 1-35-7.00-7.00



* Without written Department approval, the application of brewery wastewater on the eastern portion of the Young Farm shall not occur when the daily prevailing wind is from the west. Additionally, application in the northeast portion of the Young Farm shall not occur when the daily prevailing wind is from the south or southeast and application on the southeast portion of the Young Farm shall not occur when the prevailing wind is from the north.

REGULATORY AND SUPPORTING DOCUMENTS:

The land treatment operations shall be conducted in accordance with the following documents:

1. The Department's Guidance and Regulations Governing the Land Treatment of Wastes, Part V, the Land Treatment of Waste Products.
2. The supplemental soil report dated April 7, 2009, from Laurel Oak, LLC. requesting approval of additional lands for land application at the Burton Farm.
3. The supplemental soil report dated September 5, 2010, from Laurel Oak, LLC. for the Sequoia Farm.
4. The supplemental soil report dated July 12, 2011, from Laurel Oak, LLC. for the Spicer Farm.
5. The revised project development report dated January 21, 2014.
6. The project development report including the Young Farm application site, dated February 28, 2018.

A.1 WASTE APPLICATION LIMITATIONS

During the period beginning on the effective date and lasting through the expiration date the permittee is authorized to operate the land treatment sites identified in this permit for the application of brewery waste at agronomic rates. The timing of waste application to the sites, as well as the quantity and quality of waste to be land applied is specified below.

Application of brewery waste is limited to a maximum of 0.5 acre-inch of wastewater (13,577 gallons) per acre per week during the effective period of this permit.

When any of the limits specified in the Waste Management Plan have been achieved, no additional waste may be applied to that site unless a supplementary approval has been issued by the Department.

If supplemental fertilizers are used on those portions of the sites which have received waste, the total amount of plant available nitrogen applied shall not exceed the requirement of the current crop. Supplemental additions of commercial fertilizers shall be limited to amounts necessary to meet crop needs using the recommendations of the University of Delaware Cooperative Extension Service or a Certified Nutrient Consultant for the specified crop and anticipated yield. Records of crop yield must be kept for each application area on the site.

Fields with "high" phosphorus soil levels (greater than 150 FIV, 150 ppm Mehlich 3, 120 ppm Bray P 1 or 75 ppm Mehlich 1) must have the phosphorus site index (PSI) calculated. Fields with PSI's above "low" levels (greater than 50) must submit the PSI results and a phosphorus management plan to the Department, for review and approval, within sixty (60) days of receipt of the soil analytical data. The phosphorus management plan must demonstrate steps that will be taken to reduce the PSI or phosphorus levels in the soil. Fields with "high" phosphorus soil levels must continue to have the PSI calculated at least once every three years until the phosphorus level in the soil is no longer "high". Failure to implement a phosphorous management plan, when applicable, may result in the Department invoking the provisions of Part II, B.6 of this permit.

Waste application rates shall only be increased by the permittee with prior authorization from the Department. Before the Department can authorize any increase in waste application rates, the permittee shall submit new waste analytical results to the Department along with an application rate worksheet (including mineralization calculations if applicable) in support of the proposed increase. Reductions in the waste application rate do not require prior authorization from the Department.

A.2 OTHER LIMITATIONS

Mineralized nitrogen from prior application must be considered in calculating nitrogen application rates.

Application must be uniform over each zone or application area and made at a rate that does not contribute to runoff from the area or pooling of wastewater.

Effort must be made to significantly reduce odors, if present, either by the addition of lime to the waste prior to application, by the addition of lime after application, or by another Department approved alternative.

If necessary, effort must be made to significantly reduce vector attraction by reducing the attractiveness of the waste to the vector(s) or by preventing vectors from coming in contact with the waste. The Department may require additional vector control measures to be taken for any waste application if deemed necessary.

Non-biodegradable (e.g. plastic products, steel wool) contents incidentally applied with the brewery wastewater shall be removed.

Application is limited to 6 a.m. to 8 p.m. In the event of an emergency the Department may make exception to this condition.

Application is forbidden during periods of active rain, onto excessively wet ground or onto snow in excess of 2 inches cover. Application to frozen ground may be made if no runoff from the application area occurs.

Application of any wastewater other than Dogfish Head Craft Brewery Wastewater to the approved site is prohibited and will result in the revocation of this permit.

At minimum, buffer zones established pursuant to Part III, (B), of the Guidance and Regulations Governing the Land Treatment of Wastes shall be maintained at all times during waste application. The permittee shall ensure aerosols from the application of brewery wastewater does not impact neighboring residences or drift onto public roads at any time. The permittee shall assess wind conditions throughout application periods and extend buffer zones as necessary. In accordance with recordkeeping requirements in Part I, F. b of this permit, a log shall be maintained indicating the approximate wind direction for each load brewery wastewater applied. Brewery wastewater shall not be applied at any of the site locations approved in this permit when the wind carries aerosols in prohibited direction(s) listed for each application site in Part I of this permit. Upon the occupation of newly constructed residences or odor complaints from existing residences, the Department may require more stringent or additional buffer zones upon notifying Dogfish Head in writing.

No waste shall be applied if sample analysis yields pollutant concentrations in excess of the following values:

Arsenic	41 mg/kg	Cadmium	39 mg/kg	Chromium	1200 mg/kg	Copper	1500 mg/kg
Lead	300 mg/kg	Mercury	17 mg/kg	Molybdenum	18 mg/kg	Nickel	420 mg/kg
Selenium	36 mg/kg	Zinc	2800 mg/kg	-	-	-	-

A.3 GROUNDWATER LIMITATIONS

Application of brewery waste to the designated fields shall not cause groundwater to be in violation of applicable Federal or State Drinking Water Standards on an average annual basis. Should down-gradient water supply wells (public or private) be impacted above applicable Federal or State drinking water standards from the land application of brewery waste, the permittee shall be required to provide a free Department approved alternative potable water supply to the affected parties.

B. MONITORING REQUIREMENTS

During the period beginning on the effective date and lasting through the expiration date the permittee is authorized to conduct a land treatment system for brewery waste. All brewery waste shall be monitored by the generator as specified below:

B. 1 BREWERY WASTE

Parameter	Measurement	Sampling Frequency	Sample Type
Moisture content	percent	Quarterly	Composite
Total Nitrogen as N (dry weight basis)	percent	Quarterly	Composite
Organic Nitrogen as N (dry weight basis)	percent	Quarterly	Composite
Ammonium and Nitrate Nitrogen as N (dry weight basis)	percent	Quarterly	Composite
Phosphorus (dry weight basis)	percent	Quarterly	Composite
Potassium (dry weight basis)	percent	Quarterly	Composite
Chloride (dry weight basis)	mg/kg	Quarterly	Composite
Sodium (dry weight basis)	mg/kg	Quarterly	Composite
pH	S.U.	Quarterly	Composite
Arsenic (dry weight basis)	mg/kg	Every 5 Years	Composite
Cadmium (dry weight basis)	mg/kg	Every 5 Years	Composite
Chromium (dry weight basis)	mg/kg	Every 5 Years	Composite
Copper (dry weight basis)	mg/kg	Every 5 Years	Composite
Iron (dry weight basis)	mg/kg	Every 5 Years	Composite
Lead (dry weight basis)	mg/kg	Every 5 Years	Composite
Mercury (dry weight basis)	mg/kg	Every 5 Years	Composite
Molybdenum (dry weight basis)	mg/kg	Every 5 Years	Composite
Nickel (dry weight basis)	mg/kg	Every 5 Years	Composite
Selenium (dry weight basis)	mg/kg	Every 5 Years	Composite
Zinc (dry weight basis)	mg/kg	Every 5 Years	Composite

* All samples must be taken from the brewery waste storage tank and be representative of the brewery waste.

B. 2 SOIL MONITORING

Parameter	Measurement	Sampling Frequency	Sample Type
% Organic Matter	percent	Annually	Composite
Soil Nitrate	mg/kg	Annually	Composite
Phosphorus (dry weight basis)	mg/kg	Annually	Composite
Potassium (dry weight basis)	mg/kg	Annually	Composite
Chloride (dry weight basis)	mg/kg	Annually	Composite
Electrical Conductivity (EC)	mmhos/cm	Annually	Composite
Sodium (dry weight basis)	mg/kg	Annually	Composite
Sodium-Adsorption Ratio (SAR)	ratio	Annually	Composite
pH	S.U.	Annually	Composite
Arsenic (dry weight basis)	mg/kg	Every 5 Years	Composite
Cadmium (dry weight basis)	mg/kg	Every 5 Years	Composite
Chromium (dry weight basis)	mg/kg	Every 5 Years	Composite
Copper (dry weight basis)	mg/kg	Every 5 Years	Composite
Iron (dry weight basis)	mg/kg	Every 5 Years	Composite
Lead (dry weight basis)	mg/kg	Every 5 Years	Composite
Mercury (dry weight basis)	mg/kg	Every 5 Years	Composite
Molybdenum (dry weight basis)	mg/kg	Every 5 Years	Composite
Nickel (dry weight basis)	mg/kg	Every 5 Years	Composite
Selenium (dry weight basis)	mg/kg	Every 5 Years	Composite
Zinc (dry weight basis)	mg/kg	Every 5 Years	Composite

NOTE: Soil chemistry testing must be in accordance with the Methods of Soil Analysis published by the American Society of Agronomy, and in accordance with Part III, (B), Section 151 of the Department's Guidance and Regulations Governing the Land Treatment of Wastes. See Part I, F. for reporting requirements.

The Department may modify the sampling frequency based upon review of continuing or additional analyses.

B. 3 GROUNDWATER MONITORING

Parameter	Unit of Measurement	Minimum Frequency	Sample Type
Depth to Water	Hundredths of a foot	Quarterly	In-Situ
pH	S.U.	Quarterly	Field Test
Dissolved Oxygen	mg/l	Quarterly	Field Test
Specific Conductivity	UMHOS/CM	Quarterly	Field Test
Temperature	°C	Quarterly	Field Test
Total Dissolved Solids	mg/l	Quarterly	Field Test
Total Nitrogen as N	mg/l	Quarterly	Grab
Total Kjeldahl Nitrogen	mg/l	Quarterly	Grab
Nitrate + Nitrite Nitrogen	mg/l	Quarterly	Grab
Ammonium as N	mg/l	Quarterly	Grab
Total Phosphorus	mg/l	Quarterly	Grab
Chloride	mg/l	Quarterly	Grab
Sodium	mg/l	Quarterly	Grab

* Groundwater samples shall be taken in compliance with the monitoring requirements specified above and shall be taken at each monitoring well in accordance with procedures approved by the Department and listed in the Department's Field Manual for Groundwater Sampling (March, 1988).

** Groundwater monitoring results for each monitoring well shall be reported using the State of Delaware Well Identification Tag Number that is required on all wells in accordance with the Delaware Regulations Governing

the Construction and Use of Wells, Section 10, A (as amended).

The Department may modify the sampling frequency based upon review of continuing or additional analyses.

C. SCHEDULE OF COMPLIANCE

Within one hundred eight (180) days of permit issuance, Dogfish Head shall submit a plan completed by, or under the supervision of, a Delaware-licensed professional geologist (PG), or a professional engineer qualified in hydrology and licensed to practice in the State of Delaware for review and approval. The plan shall include the proposed location and construction details of a network of groundwater monitoring wells sufficient to determine groundwater flow direction and to characterize groundwater beneath the Payton Farm, Baker Farm, Burton Farm, Sequoia Farm, and Spicer Farm. Upon DNREC approval of the plan, groundwater monitoring wells shall be installed, surveyed (top of casing to 0.01 feet accuracy) and sampled for the parameters and frequency listed in Part I, B.3 of this permit.

D. BONDING

Not required pursuant to Part V. of the Guidance and Regulations Governing the Land Treatment of Wastes.

E. MONITORING

1. Representative Sampling:

Samples and measurements taken as required herein shall be representative of the volume and nature of the waste to be land applied.

2. Recording of Results:

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a) The exact place, date and time of sampling and/or measurement;
- b) The person(s) who performed the sampling and/or measurement;
- c) The dates and times the analyses were performed;
- d) The person(s) who performed the analyses;
- e) The results of each analysis.

3. Records Retention:

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recording from continuous monitoring instrumentation shall be retained for five (5) years. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or regarding control standards applicable to the permittee, or

as requested by the Department.

F. REPORTING

1. The permittee shall submit to the Department and landowners an annual operation report on or before February 1 of each year. The annual operation report shall include the following:
 - a) The daily operational record (as specified in Part II, A.1);
 - b) ~~The weight (wet and dry tons) and volume of brewery wastewater utilized at the land application site.~~ A Department approved log shall be maintained that demonstrates that brewery wastewater is applied uniformly on each field. Additionally, the log shall include the approximate wind direction and speed during all application activities;
 - c) The weight of nitrogen, phosphorus and potassium from waste applied to each field. Supplemental fertilizers must be reported separately;
 - d) Any changes in ownership of the land where the operation is conducted or any change in any lease agreement for the use of such land that may affect or alter the operator's rights upon such land;
 - e) A chemical analysis of soil from each field and each well for the constituents identified in Part I, B.2 and B.3 (as applicable). The procedure for soil and water analysis shall be consistent with Department guidance;
 - f) Site maps showing the boundaries within each field where waste has been applied during the previous year;
 - g) For each site: the cropping scheme followed during the previous year and anticipated for the coming year; crop yield data and an explanation of which portions of the plants were harvested; identification of fields to be used during the coming year; waste application rates for the coming year based on nitrogen mineralization calculations from previous waste application practices;
 - h) Waste application rate adjustments, if necessary; (See Part I, A.1)
 - i) Any other information required by the Department.
2. Waste analytical data obtained during the previous monitoring period shall be summarized for each period and postmarked no later than the 28th day of the month following the completed reporting period. If no waste was applied during this period a signed statement saying no application occurred this period shall be submitted to the Department. Signed copies of these, and all other reports required herein, shall be submitted to the Department at the following address:

**DELAWARE DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL, DIVISION OF WATER RESOURCES,**

**SURFACE WATER DISCHARGES SECTION, 89 KINGS HIGHWAY,
DELAWARE 19901; TELEPHONE: (302) 739-9946**

When submitting monitoring results, copies of the original laboratory sheets should be included. If more than one sample is analyzed during any month, a table showing the range of constituent concentration values shall be prepared and included with the submittal.

3. The permittee shall submit copies of all monitoring results covered by condition F.2 above to the landowner of each site.

4. Test Procedures

Test procedures for all analyses shall conform to the applicable test procedures identified in Part III, (B), Section 152 of the Department's Guidance and Regulations Governing the Land Treatment of Wastes, unless otherwise specified in this permit.

G. DEFINITIONS

1. "Agricultural Utilization" means the application rate of wastes or waste or waste products which shall not exceed the nutrient needs of the crop grown on the particular soil plus the other assimilative pathways in soils (e.g. immobilization with organic material, volatilization, and leachate in compliance with drinking water standards).
2. "Composite" means a series of grab samples which have been collected in a manner such that the final sample is representative of the volume and characteristics of the material to be analyzed.
3. "Land application" means the placement of waste within 2 feet below the surface of land used to support vegetative growth.
4. "Treatment" means a process which alters modifies or changes the biological, physical, or chemical characteristics of waste.

Part II

A. MANAGEMENT REQUIREMENTS

1. Land Application of Waste

The permittee shall prepare and maintain an operational record for each day that waste is applied and when any other management activities are conducted at the land application sites. The daily operational record shall include the following:

- a) The date, type, volume, and weight of the wastes applied;
- b) A record of any major deviations (if applicable) from the operating plan;
- c) Weather conditions at the time of application;
- d) The application rate of waste in gallons/acre for every application;
- e) A running total of the volume applied per acre for each month;
- f) A map for each site showing the area of daily activity;
- g) A record of all actions taken to correct violations Department Regulations;
- h) Management undertaken, such as planting and harvesting of crops, fertilizers and chemicals added, irrigation frequency, techniques used, etc.

2. Change in Operation

The application of waste to the sites authorized herein shall be consistent with the terms and conditions of this permit. The application of waste at levels in excess of the amount necessary to provide plant available nitrogen for the crop being grown, in accordance with the limits identified in Part I, A.1, A.2, and A.3 of this permit, shall constitute a violation of the permit. Any anticipated facility expansion, production increase, or change in site conditions which would affect the land limiting constituent, create a new land limiting constituent, or adversely affect site conditions must be reported to the Department. Upon review of this information, the Department may invoke the provisions of Part II, B.6 of this permit.

3. Noncompliance Notification

The permittee shall report to the Department:

- a) In writing thirty (30) days before any planned physical alteration or addition to the permitted facilities or activities, if that alteration or addition would result in any significant change in information that was submitted during the permit application process;
- b) In writing thirty (30) days before any anticipated change which would result in noncompliance with any permit condition of the Guidance and Regulations Governing the Land Treatment of Wastes;
- c) Orally within twenty-four (24) hours from the time the permittee became aware of any noncompliance which may endanger the public health or the environment, at (800) 662-8802. In addition, a call must be placed at (302) 739-9946 during normal business hours, and;
- d) In writing as soon as possible but within five (5) days of the date the permittee knows or should know of any noncompliance unless extended by the Department;

This report shall contain:

- 1) A description of the noncompliance and its cause;
 - 2) The period of noncompliance including to the extent possible, times and dates and, if the noncompliance has not been corrected, the anticipated time it is expected to continue; and
 - 3) Steps taken or planned to reduce or eliminate reoccurrence of the noncompliance.
- e) In writing as soon as possible after the permittee becomes aware of relevant facts not submitted or incorrect information submitted, in a permit application or any report to the Department. Those facts or the correct information shall be included as a part of this report.

4. Minimize Impacts

The permittee shall take all necessary actions to eliminate and correct any adverse impact on the public health or the environment resulting from permit noncompliance.

B. RESPONSIBILITIES

1. Renewal Responsibilities

At least 180 days before the expiration date of this permit, the permittee shall submit a new application for a permit or notify the Department of the intent to cease operation by the expiration date. In the event that a timely and sufficient reapplication has been submitted and the Department is unable, through no fault of the permittee, to issue a new permit before the expiration date of this permit, the terms and conditions of this permit are automatically continued and remain fully effective and enforceable.

2. Entry and Access

The permittee shall allow the Department, consistent with 7 Del. C., Chapter 60, to:

- a) Enter the permitted facilities;
- b) Inspect any records that must be kept under this permit;
- c) Inspect any facility, equipment, practice, or operation permitted or required by this permit;
- d) Sample or monitor for the purpose of assuring permit compliance, any substance or any parameter at the facility or land application site.

3. Provide Information

The permittee shall furnish to the Department within a reasonable time, any information requested, including copies of records, which may be used by the Department to determine whether cause exists for modifying, revoking, reissuing, or terminating the permit, or to determine compliance with the permit or Part V. of the Guidance and Regulations Governing the Land Treatment of Wastes.

4. Transfer of Ownership or Control

This permit shall be transferable to a new owner or operator provided that the permittee notifies the Department by requesting a minor modification of the permit before the date of transfer and provided that the transferee shows evidence of a legal right to use the site and is otherwise in compliance with all applicable provisions of Part V. of the Department's Guidance and Regulations Governing the Land Treatment of Wastes.

5. Operation of Facility

The permittee shall at all times properly maintain and operate all structures, systems, and equipment for treatment, control and monitoring, which are installed or used by the permittee to achieve compliance with this permit or Part V. of the Guidance and Regulations Governing the Land Treatment of Wastes.

6. Permit Revocation and Modification

a. After notice and opportunity for a hearing, this permit may be modified or revoked in whole or in part during its term for cause including, but not limited to, the following:

- 1) Violation of any terms or conditions of this permit;
- 2) Obtaining this permit by misrepresentation or failure to disclose fully all of the relevant facts;
- 3) Any change in operating conditions that requires either a temporary or permanent permit modification; or
- 4) If the Department finds that the public health, safety or welfare requires emergency action, the Department shall incorporate findings in support of such action in a written notice of emergency revocation issued to the permittee. Emergency revocation shall be effective upon receipt by the permittee. Thereafter, if requested by the permittee in writing, the Department shall provide the permittee a revocation hearing and prior notice thereof. Such hearings shall be conducted in accordance with 7 Del. C., Chapter 60.

b. The Department may revoke this permit if the permittee violates any permit condition, any provisions of Part III, (B) or Part V., of the Guidance and Regulations Governing the Land Treatment of Wastes, or fails to pay applicable Department fees.

7. Permit Closure Report

a. All land approved for the Agricultural Utilization of waste is required to have a closure report when the land is no longer being utilized as described in permit application. The report must be submitted to the Department within four (4) months of determination that the field will no longer be utilized for waste application. The closure report will have the following:

- 1) Letter from permittee stating the application site (with tax parcel number(s)) will no longer receive waste approved by this Permit.
- 2) Copy of the last waste monitoring results as required in Part 1,

B.1 of this permit.

- 3) Copy of the last soil monitoring results as required in Part 1, B.2 of this permit.

8. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under 7 Del. C., Chapter 60.

9. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.

10. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

11. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application or any provision of this permit to any circumstances is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

12. Compliance Required

The permittee shall comply with all conditions of the permit.

13. Reopener

In the event that the Part III, B, of the Guidance and Regulations Governing the Land Treatment of Wastes or applicable Federal Regulations are revised, this permit may be reopened and modified accordingly after notice and opportunity for a public hearing.

Part III

A. SPECIAL CONDITIONS

The permittee must ensure that the following conditions are met:

1. Waste shall be transported to the land treatment sites in accordance with Delaware Non Hazardous Waste Transporters Permit No. OH-103.
2. Pre Start-Up (Must be accomplished annually for each application site)
 - a) Prior to the application of waste, buffer zones and the areas on which waste is to be applied must be clearly marked with stakes or other suitable markers acceptable to the Department.
 - b) The permittee must notify the Department at (302) 739-9946 at least two (2) working days prior to the application of waste.
 - c) Before the permittee can begin to apply waste to the designated site, a pre start-up inspection may be conducted by the Department to verify that proper buffer zones and non-application areas are suitably marked. Based on the results of the pre start-up inspection, the Department will either:
 - 1) Grant approval for waste application operations to begin or;
 - 2) Require the permittee to perform additional site preparation (such work must be performed and approved prior to waste application).
3. Post Application Measures
 - a) The permittee shall adhere to the vegetative management plans for each site.
 - b) Any change in the proposed vegetative management plan must be approved by the Department prior to implementation.
4. Regulatory Modification

In the event that the Guidance and Regulations Governing the Land Treatment of Wastes or any applicable federal regulations are revised, this permit may be reopened and modified accordingly after notice and opportunity for a public hearing.
5. Supersedes Previous Permit

This permit supersedes all land application permits previously issued to Dogfish Head Craft Brewery.

