

ENVIRONMENTAL ANALYSIS AND DECISION ON THE NEED FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS)

Form 1600-1

Rev. 7-2006

Department of Natural Resources (DNR)

Region or Bureau SCR
Type List Designation Type II

NOTE TO REVIEWERS: This document is a DNR environmental analysis that evaluates probable environmental effects and decides on the need for an EIS. The attached analysis includes a description of the proposal and the affected environment. The DNR has reviewed the attachments and, upon certification, accepts responsibility for their scope and content to fulfill requirements in s. NR 150.22, Wis. Adm. Code. Your comments should address completeness, accuracy or the EIS decision. For your comments to be considered, they must be received by the contact person before 4:30 p.m., July 8, 2010.

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Applicant **(a)**: Clear Horizons Dane, LLC

Address: 5070 N. 35<sup>th</sup> Street, Milwaukee, WI 53209

Title of Proposal: Dane County Manure Handling Facility (MHF)

Location: County: Dane City/Town/Village: Town of Vienna

Township Range Section(s): T.9N.-R.9E. Section 31

Applicant **(b)**: White Gold Dairy, LLC, Jerry & Rich Maier

Address: 6200 Maier Road, Waunakee, WI 53597

Title of Proposal: Maier Expansion WPDES Permit

Location: County: Dane City/Town/Village: Town of Vienna

Township Range Section(s): T.9N.-R.9E. Section 31

PROJECT SUMMARY

1. Brief overview of the proposal including the DNR action (include cost and funding source if public funds involved)

There are two projects involved within this Environmental Assessment: the Dane County MHF, operated by Clear Horizons Dane, LLC, and the expansion of the White Gold Dairy, LLC farm. White Gold Dairy is one of the three farms planned to participate in the Dane County MHF. The Department has proposed to issue separate individual Wisconsin Pollutant Discharge Elimination System (WPDES) permits to the Dane County MHF and White Gold Dairy. Ripps Dairy Valley has a current WPDES permit as a large farm. White Gold Dairy has applied for a WPDES permit because the expansion they have planned will make them a large permit. Clear Horizons Dane, LLC has applied for a WPDES permit because it is a new industrial processing facility. Although this project will result in the sharing of a manure handling system, many aspects of the facilities will be separate.

**(a)** The Dane County MHF's primary goals are to protect water quality in the Lake Mendota watershed as related to manure management, sustain and grow agriculture within Dane County and to work toward these goals in an economically viable manner. In addition, this project will also produce clean energy – enough to power 2,500 homes. The facility consists of 3 manure digesters, associated electric generating equipment, solids separating centrifuge and solids exporting features. The facility includes pipe to and from the three farms it serves: Ripps Dairy Valley, White Gold Dairy, and Endres Dairy. The facility's initial capacity will allow additional farms to be served and the site has space for future expansion to create more capacity. The manure facility will be located in Dane County within the Town of Vienna in Section 31 off of Cuba Valley Road.

This location was chosen through multiple means. There was a survey conducted to find producers that had an interest in participating in a manure management project. From the interested farmers, sites were assessed to find a location that could serve multiple farms with large animal units with one digester facility. The SWAT model, which was run by a private company for the county, distinguished the chosen location as being one of high priority. The model took into account landscape features,

including soils and slopes, farming practices, animal units and so forth.

This project builds on the Yahara Lakes Legacy Partnership and the Yahara CLEAN memorandum of Understanding between Dane County, City of Madison, Departments of Natural Resources and Agriculture, Trade and Consumer Protection to reduce nutrients and sediments into the Yahara Lakes system. Current DNR and University of Wisconsin Madison (UW-Madison) research shows that reducing phosphorus (P) and nitrogen (N) in the watershed's runoff will significantly reduce the frequency of algae blooms on Lake Mendota, and in addition, that the largest source of phosphorus and N entering Yahara Lakes comes from agricultural runoff. The digester facility will be owned, designed, constructed, and operated by Clear Horizons Dane LLC (CHD). The equipment that relates to removal will be owned by the State/County and leased to CHD. The property that the digesters and the storage and treatment buildings for this project will be located on is land owned by the Dane County and will be leased to Clear Horizons Dane, LLC

The liquid manure from all three farms will be pumped to the digester site for processing and the post-digested liquids will be pumped back to the farms for storage. Each farm will have a central collection pit for their manure. Adjacent to the collection pit will be a dry well to house the pumping system. The pumping system will consist of a grinder and rotary lobe pump that are hydraulically driven. The manure will be pumped to the digester site through an 8" force main. A spare 8" force main will be installed from each farm to the site as a back-up.

The manure from all three farms will enter the site through the manure pumping building. The amount of manure from each farm will be measured through a flow meter and will be sent to a 100,000 gallon raw manure equalization tank. This is anticipated to be approximately 82,000 gallons each day. The manure from the equalization tank will be metered into each of the three digesters. The site will also include a manure receiving building. This building will be capable of accepting liquid or solid manure from the three, future participating farms, and other farms on a temporary basis. This can include bedding pack manure, frozen manure, or other organic by-products. The manure receiving building will consist of an in-ground concrete mixing pit with two submersible agitators. There will be a pipe from the digestate storage tank to the mixing tank to provide the necessary liquids to mix and thaw the manure so it can be pumped. Adjacent to the mixing pit will be a dry well that houses the grinder and manure pump. The entire system will be housed inside a building to control odors. The manure will be metered and transferred to the equalization tank.

There will also be two one substrate storage tanks on the site. These tanks will store fats, oils, and greases (FOG) from food processing waste for supplementing the biogas production of the facility. The FOG was selected to provide a feed stock with a high energy density, but relatively low nutrient content. The substrate increases the system's economic viability.. It is anticipated that about 7,500 gallons per day of substrate will be added to the manure. The substrate quantity will also be metered prior to feeding into the digesters.

Each digester has a 1,250,000 gallon effective capacity for an initial total digester capacity of 3,750,000 gallons and a future build out capacity for one more digester for a total capacity of 5,000,000 gallons. Each digester consists of an above ground bolted steel tank secured to a concrete foundation. Each digester contains a mixing system that consists of three turbo prop mixers and two submersible mixers. The turbo prop mixers provide the primary mixing of the digester. One of the submersible mixers will be positioned near the digester feed inlet to assist in mixing the fresh manure with the digester contents. The other submersible mixer will be positioned near the top of the digester to control the solids build-up on the top of the digester. The digester has a double membrane roof. The outer membrane is held in place by an air blower that creates a low pressure between the two bladders. The inner bladder captures the biogas created during the digestion process and can raise and lower depending on the rate of biogas production. The biogas bladder typically operates at a biogas pressure of 0.5" to 1.2" of water column. There are over pressure and vacuum pressure emergency safety devices mounted to the top of the tank to protect the integrity of the tank and bladder. The digester is operated at 95-105°F. To heat the digester contents, there are rows of stainless steel piping mounted inside from the tank wall going the circumference of the tank. Hot water from the engine flows through these pipes and transfers the heat to the liquids inside the digester. The digester tank is covered with insulation and then an aluminum cladding is attached to the outside of the tank. The digester system is designed for a 25-30-day hydraulic retention time.

The digestion process is a continuous process with fresh manure always entering the digesters and the digested effluent constantly being removed from the digesters. Following the digestion process, the manure will be pumped to a centrifugal separator. This will separate the solid material from liquids. Based on full-scale testing, the centrifuge will capture approximately 60% of the phosphorus in the solids without the addition of polymers. The solids or fiber will then go through a high speed press that will heat the material to further dry it and provide a pathogen kill which will eliminate fecal coliform and salmonella to ensure bio-security between the participating farms. After it passes through the press, it will be conveyed and stored inside the solids building. Inside the solids building, there will be one bay where fiber will be stored for use as bedding for the farms. The other bay will consist of truck loading stalls where the fiber will be directly loaded into truck trailers for transport to a horticultural

wholesaler for sale or further processing. The site will include a truck scale so the material leaving the watershed can be measured and verified.

The liquids from the centrifuge will go to a 100,000 gallon digestate storage tank and will be metered back to each farm based on the amount of manure that was originally transferred to the site. There will be a 6" force main from the site to the farm to transport the liquids for storage. Once returned to the farm, the farm will be responsible for the storage and land application of the liquids.

The manure from the farm to the facility or digestate back to the farms could also be hauled via commercial trucking in the event that the piping system was out of service for any reason.

The biogas collected from each of the digesters will be piped to a central biogas conditioning and compression skid. This skid will remove the water vapor from the biogas and compress it to 3 psi for the engines. The biogas will be the fuel source for two (2) 1,000 kW engine generators. These will be pre-packaged units. The electricity generated will be sold to Alliant Energy. The heat from the engines will be captured and piped back to the pumping building where it will be distributed to heat the digesters, tanks, and buildings on the site. In the event the engines are down and there is no longer any biogas storage available in the digesters, a flare will be used to burn off the excess biogas.

Since this is proposed as a community digester, certain design features are incorporated into the initial phase of construction to facilitate the possibility of adding additional farms to the system. These include the addition of the manure receiving building on site, room allocated for a fourth digester, and the solids processing facility sized to accommodate future expansion.

Estimated costs of the Dane County MHF are:

Item	Description	Budget
1	On-farm manure collection/pumping/piping	\$1,500,000
2	Digester site manure collection/pumping/piping	\$550,000
3	Digester system	\$2,800,000
4	2 MW CHP System	\$2,400,000
5	Biogas cleaning/compression	\$380,000
6	Process/Automation/Controls	\$940,000
7	Substrate system	\$130,000
	<b>CHD Scope</b>	<b>\$8,700,000</b>
8	Fiber separation and drying system	\$1,550,000
9	Dane County MHF Site Acquisition, Improvements and Fiber Distribution Building	\$1,750,000
	<b>State/Dane County Scope (State funds are from Wisconsin Department of Administration (DOA))</b>	<b>*\$3,300,000</b>
		<b>\$12,000,000</b>

\* This sum has been allocated in the State Capital Budget to pay for items related to water quality improvement. Allocations for specific items in line items 8 and 9 above have not been finalized at the time this EA was written and are subject to further negotiation.

Dane County has provided in-kind services since the project's inception, such as outreach to participating farms and urban communities as well as hiring Strand Associates, Inc. (\$180,000.00) to complete a Community Manure Management Facilities Plan.

Currently Dane County is working with Clear Horizons Dane, LLC to ensure the following goals of the project are met:

- 1) Improve Water Quality to Lake Mendota and the chain-of-lakes
- 2) Maintain a Sustainable Agricultural Community in the Lake Mendota Watershed
- 3) Operate an Economically Viable Manure Handling Facility

(b) The White Gold Dairy project includes an expansion of animal units from 993 to 2,188, as well as the construction of three freestall barns (only one to be built immediately), a gravity manure system, concrete manure storage basin, commodity building, feed storage pad runoff control system, vegetated treatment area for feed storage runoff, and an access road. Construction is planned to begin July 1<sup>st</sup>, 2010. Construction is planned to be completed December 1<sup>st</sup>, 2010. Animal unit goals are planned to be reached in 2012.

White Gold Dairy’s herd has been continually growing as the dairy is now approaching the 1,000 animal unit threshold; therefore, they have applied for a WPDES permit for a Concentrated Animal Feeding Operation (CAFO). This permit requires the dairy to have a minimum of 180 days of storage for liquid manure. To meet this requirement, the dairy proposes to construct additional manure storage. In building new manure storage, the dairy plans to construct the storage for its anticipated future growth. Having additional storage will allow the dairy more flexibility to apply manure to cropland at times of the year when runoff is less likely. The facility has two smaller storage units, one which be abandoned and one which will be kept, pending a favorable evaluation by a private consultant and Department approval.

Following are the animal types and numbers that are currently part of the White Gold Dairy operation:

Animal Type	Current Number of Animals/Type	Average Weight per Animal/Type	Animal Unit Equivalency Conversion Factor	Total Animal Units per Animal Type
<b>Currently-2010</b>				
Milking cows	660	1,400	1.4	924
Dry cows	25	1,400	1.4	35
Heifers	13	1,100	1.1	14.3
Calves	103	150	0.2	20.6
				993.9 Total A.U.

Following is the proposed animal types and numbers after White Gold Dairy’s expansion is complete in 2013:

Animal Type	Current Number of Animals/Type	Average Weight per Animal/Type	Animal Unit Equivalency Conversion Factor	Total Animal Units per Animal Type
<b>2013</b>				
Milking cows	1,180	1,400	1.4	1,652
Dry cows	220	1,400	1.4	308
Heifers	180	1,100	1.1	198
Calves	150	150	0.2	30
				2,188 Total A.U.

White Gold plans to continue marketing milk, bull calves, and culled calves during and after the expansion.

The approximate cost for the construction of the proposed expansion is \$1,600,000. This includes earthwork, one freestall barn initially, gravity manure transfer system, reception tank, dry well, manure storage basin, feed storage pad, associated work pad area, feed storage pad runoff control system, vegetated treatment area for feed storage runoff, and access roads.

2. Purpose and Need (include history and background as appropriate)

(a) The primary goals of the project are to protect water quality in the Lake Mendota watershed as related to manure management, sustain and grow agriculture within Dane County, and work toward these goals in an environmentally viable manner. Beneficial impacts of the project include improved lake water quality, increase renewable energy and the reduction of greenhouse gases. After the digestion process and centrifuge separation, approximately 60% of the phosphorus will be concentrated in the solids. The remaining liquid, containing 40% of the phosphorus, will be returned to the participating farms for land spreading. The production of green energy through the use of anaerobic digestion will produce and capture biogas by decomposing organic wastes to run a generator which in turn will produce electricity. This generated electricity will be sold to Alliant Energy.

This project began when Dane County decided to evaluate manure handling options for reducing phosphorous runoff from farms. As part of the development of this project, Dane County performed two feasibility studies, *Community Manure Management Feasibility Study (2008)* and *Community Manure Management Facilities Plan (2009)*. These studies evaluated several alternatives for manure and phosphorous management. Even though the total number of farms and cows in the currently proposed project is slightly different than what was assessed in the feasibility studies, many of the findings in the studies are still valid for this project.

The 2008 study looked at several technologies, including: anaerobic digestion, aerobic digestion, composting, combustion, pyrolysis, gasification, sand and grit separation, at least nine methods of manure solids separation, manure drying, phosphorus minimization in feeds, advanced phosphorus removal through chemical precipitation, and others.

The review looked at the feasibility of each technology, based on economics, technological reliability, and 18 non-monetary criteria, such as phosphorus reduction, water quality impacts, and air quality impacts. The review of all of the non-monetary criteria can be found in Section 5 of the 2008 study.

Ultimately, the 2008 feasibility study found that a community system was more economical than a system at each individual farm. Additionally, this study concluded that the currently proposed project, anaerobic digestion, followed by advanced phosphorus removal, was the best option. This option is the most economical, and it also scored the highest in the assessment of environmental and other non-monetary criteria.

**(b)** White Gold Dairy's dairy herd size has been growing. The dairy is now approaching the 1,000 animal unit threshold and has applied for a WPDES permit. A WPDES permit requires the dairy have a minimum of 180 days of storage for liquid manure. To meet this requirement the dairy proposes to construct additional manure storage. In building new manure storage the dairy plans to construct the storage for its anticipated future growth. Having additional storage will allow the dairy more flexibility to apply manure to cropland at times of the year when runoff is less likely.

3. Authorities and Approvals (list local, state and federal permits or approvals required)

Applicant **(a)**

- a. Town of Vienna:
  - a. Rezoning with Certified Survey Approval
  - b. Conditional Use Permit
  - c. Building Permit
  - d. Plant Operating Agreement
- b. Dane County:
  - a. Chapter 14, Storm water, Erosion Control, Manure Storage
  - b. Rezoning with Certified Survey Approval
  - c. Conditional Use Permit Approval
- c. State of Wisconsin:
  - a. Dept. of Natural Resources:
    - i. WPDES
    - ii. Industrial
    - iii. Land spreading
    - iv. NR 216 Storm water/Construction Site Erosion
    - v. Air
  - b. Dept. of Commerce:
    - i. Electrical
- d. Federal: none

Applicant **(b)**

- a. Dane County:
  - a. Manure Storage Permit
  - b. Storm water Management Permit
  - c. Shoreland Erosion Control Permit
- b. State of Wisconsin:
  - a. Dept. of Natural Resources:
    - i. WPDES
    - ii. Construction Site Erosion Control Permit
    - iii. High Capacity Well Permit
    - iv. Chapter 30 Grading Permit

4. Manipulation of Terrestrial Resources (include relevant quantities - sq. ft., cu. yard, etc.)

(a) The site of the Dane County MHF will include 544,700 sq ft of disturbed area during construction, with that; there will be 126,907 sq ft of new impervious surface (including the access road to the facility). The site location is comprised of agriculture cropland. The access road meets Cuba Valley Road to the North, running south to the facility, which sits with Endres Dairy directly to the north and White Gold Dairy to the south. (See Attachment D)

(b) White Gold Dairy's expansion project will disturb approximately 14 acres and 120,000 cubic yards of material will be disturbed as part of the dairy construction. The length of the construction at the farm expansion site is expected to be approximately 5 months. It is not anticipated that soil will be stockpiled for future use. Fill for the site will come from excavations of the basin and buildings. Some road materials will be brought in for construction of the access roads. The site will utilize the existing farm entrance. Gravel access roads will be constructed from this entrance to the proposed barn and basin area.

5. Manipulation of Aquatic Resources (include relevant quantities - cfs, acre feet, MGD, etc.)

(a) There will be no manipulation of aquatic resources as a result of either of these proposals.

6. Buildings, Treatment Units, Roads and Other Structures (include size of facilities, road miles, etc.)

(a) The MHF will consist of a 1,400' paved driveway to the site, a manure receiving building, substrate storage tank(s), a pumping and control container, a raw manure storage tank, (3) digester tanks, solids separation container, solids storage building, digestate storage tank, and two generator containers. See Attachment K for details on structures sizes and layout.

(b) White Gold Dairy's expansion will consist of the following: two freestall barns -200 ft by 65 ft and 188 ft by 117 ft, freestall barn -352 ft by 117 ft (future barn), gravity manure transfer system, concrete manure storage basin-320 ft dia. by 16 ft deep, 65ft by 125 ft feed storage pad associated work pad area, commodity building -70 ft by 50 ft (future building), feed storage pad runoff control system, vegetated treatment area for feed storage runoff, and access roads-approximately 1,000 ft. See Attachment L for details on structures and farm layout.

7. Emissions and Discharges (include relevant characteristics and quantities)

(a) The manure receiving tank at the facility site will be covered by a building, the raw manure above ground tank will be covered, and the solids storage building will be enclosed to minimize odors. Hazardous pollutants, including ammonia, hydrogen sulfide, and methane will be addressed in this project. Typically the greatest ammonia odor is present in the solids shortly after coming out of the separator. To address this concern, the solids will be enclosed in a building to control any possible odor. The hydrogen sulfide will be scrubbed out of the biogas at the top of each digester prior to the biogas being utilized by the engines for fuel. Scrubbing should reduce hydrogen sulfide levels from about 3,000 to 5,000 ppm to less than 275 ppm. The installation of the digester will reduce the amount of methane released into the atmosphere equivalent to the reduction in carbon dioxide emissions of 25 to 30 tons per day or approximately 10,000 tons per year.

This facility will receive manure from three farm operations consisting of approximately 4,160 (2013) animal units and 3,575 acres for land spreading. Based upon nutrient management plans (NMP) submitted by each operation, sufficient crop acres are available for the land application of manure. These numbers will increase with the expansion of White Gold Dairy's operation. Though the facility will be rather large in capacity, controlled anaerobic digestion of animal manure has been a proven method of reducing foul odors. Odors become an issue under uncontrolled anaerobic digestion, which will not be occurring at this facility (see item 10, p. 7 for more information).

### **Air Quality Impacts**

#### **Ambient Air Emissions**

The digester facility operations result in ambient air emissions. Sources of air emissions from the facility operations include the manure handling and storage, an anaerobic digester, two 1,059 kW generators, a digester flare, dewatering and drying equipment, as well as vehicles and vehicle traffic emissions. The common forms of air pollution associated with the Digester facility operations will be odor, particulate matter and fugitive dust, pollutants of combustion and various hazardous air pollutants.

### Odor

Wisconsin Administrative Code requires all sources of air emissions to regulate objectionable odors (s. NR 429.03, Wis. Adm. Code). This rule establishes general limitations on objectionable odor, defines the tests for what constitutes objectionable odor, and sets abatement or control requirements.

To minimize odors, the incoming manure receiving tank, the raw manure above ground tank, and the solids storage, at the facility, will all be covered by buildings. Effluent odor from anaerobic digesters is significantly less than odors from conventional manure management systems. There is not expected to be odors associated with the combustion of biogas. When engines are down for maintenance or repair there may be some odors, but this should occur very infrequently.

Clear Horizons – Dane LLC will be required to prepare a malodorous emissions control plan to document the steps to be taken to control odors resulting from the operation of the anaerobic digester and address any complaints received.

### Particulate Matter & Fugitive Dust:

Wisconsin's fugitive dust rule, s. NR 415.04, Wis. Adm. Code, establishes general limitations on fugitive dust and sets specific precautions for limiting fugitive dust emissions. Ambient air quality standards for particulate matter are established in s. NR 404.04, Wis. Adm. Code. An ambient air quality standard for fine particulate matter (PM<sub>2.5</sub>) has been established at the federal level. The federal and state PM<sub>2.5</sub> standards are 15.0 µg/m<sup>3</sup>, annual arithmetic mean, and 35 ug/m<sup>3</sup>, 24-hour average. As of this writing, there are no particulate matter non-attainment areas in Wisconsin, except for PM 2.5 - Milwaukee, Racine and Waukesha counties.

Fugitive dust emissions during construction from gravel driveway and routine traffic can be controlled with the implementation of a watering program. After constructed, the access road will be paved and any remaining gravel areas on the site will be watered as needed to minimize dust.

### Hazardous Air Pollutants:

In Wisconsin, hazardous air pollutant emissions are regulated under ch. NR 445, Wis. Adm. Code. This rule establishes ambient air standards for specific hazardous air pollutants, off the source's property. The criteria for determining which pollutants are regulated and how the standards are established is set in s. NR 445.13, Wis. Adm. Code. The criteria include conditions based on determinations by the International Agency for Research on Cancer, the National Toxicology Program, the American Conference of Governmental Industrial Hygienists, and the US EPA.

### **HAZARDOUS AIR POLLUTANT REVIEW: Ch. NR 445, Wis. Adm. Code and Section 112(b) Clean Air Act (from the ANALYSIS AND PRELIMINARY DETERMINATION FOR OPERATION PERMIT # 113373040-F01)**

There are several pollutants expected to be emitted from the operation of the facility (hydrogen sulfide, ammonia, formaldehyde). However, under s. NR 445.01(b), the requirements under ch. NR 445, Wis. Adm. Code, do not apply to hazardous air pollutants emitted by emission units that are regulated by a National Emission Standard for Hazardous Air Pollutants (NESHAP) promulgated under s. 112 of the Clean Air Act. Because the two engine generators are subject to the standards under 40 CFR 63 subpart ZZZZ, the hazardous air pollutants emitted by these pollutants will not be reviewed with the exception of formaldehyde. Under 40 CFR 63 subpart ZZZZ, compliance with the standards under 40 CFR 60 subpart JJJJ for spark ignition reciprocating internal combustion engines (SI RICE) is in compliance with the NESHAP. In previous Department reviews, because the NSPS sets limitations on carbon monoxide emissions, and carbon monoxide is used as a surrogate for Federal HAP emissions in the NESHAP, the emission unit is presumed to be regulated by an emission standard in a NESHAP.

The permittee will be required to perform emission testing on the generator stack to quantify the emission rate of formaldehyde to ensure emissions are below major source thresholds (formaldehyde emissions are regulated under ch. NR 445, Wis. Adm. Code). The threshold value in Table A column (c) for stacks less than 25 feet is 137 pounds per year. No significant emissions of state or Federal HAPs are expected from the anaerobic digester after control by the flare, when the engine generators are not functioning. Based on maximum theoretical uncontrolled emission rates, the anaerobic digester would produce emissions of hydrogen sulfide less than the ch. NR 445, Wis. Adm. Code, Table A, thresholds at a flare height less than 25 feet above ground level. The hydrogen sulfide will be scrubbed out of the biogas at the top of each digester prior to the biogas being utilized by the engines for fuel. Scrubbing should reduce hydrogen sulfide levels from about 3,000 to 5,000 ppm to less than 275 ppm.

Ammonia emissions from the manure storage tanks will be controlled by covered buildings.

The Air Management program requested and received authority from the Natural Resources Board to address toxic air emissions from agricultural waste. The process to address these agricultural air emissions will include two steps. First, an advisory group of technical and operational experts as well as environmental advocates and health experts will review current information and practices and develop recommended Best Management Practices (BMP's) for agricultural waste emissions. Advisory group members, meeting dates, agendas, notes, and associated material, as well as products from the meetings, are posted at <http://dnr.wi.gov/air/agWaste.html>. Second, after the BMPs have been identified, DNR will develop an implementation process, which is expected to include Administrative Rules.

### **Greenhouse Gases (GHG)**

Conventional liquid and slurry manure management practices emit large amounts of methane, a greenhouse gas that contributes to global warming by trapping energy from the sun and from human activity. Digesters capture and destroy methane through combustion in an engine or flare thus reducing greenhouse gas emissions. The combustion of methane produces CO<sub>2</sub> and water. Methane is considered to be 20 to 24 times as powerful as CO<sub>2</sub> in its effect on global warming, therefore, overall impact of converting methane to CO<sub>2</sub> is considered beneficial. The combustion of this renewable fuel off-sets energy that would otherwise be derived from fossil fuels. Therefore, by not burning fossil fuels there will be a reduction in carbon dioxide emissions, another greenhouse gas.

### **Generator Engine & Flare Emissions**

There will be an increase in air emissions from the digester process due to the combustion of methane by the generators. In addition, there will be a reduction of fossil fuel usage by reducing transportation, the land spreading activities that are currently used to dispose of the waste stream, and there will be less fossil fuel used to produce electricity.

The two engine generators serve as both a control device and an emission unit for methane generated by the three (3) anaerobic digesters. The flare serves as a backup control device for the anaerobic digester if one or both engines are off-line.

Emissions from combustion in the generators and flares will consist of particulate matter, nitrogen oxides, sulfur dioxide, carbon monoxide, total VOCs and minor amounts of HAPs (see Hazardous Air Pollutants section).

There will be some additional pollutants of combustion from diesel exhaust (semi trucks & construction equipment) during construction, and while delivering and shipping raw materials and product from the facility.

Because the manufacturer of the engines does not certify that they will meet these emission limits for the life of the unit, while combusting biogas, the facility will be required to do performance tests on the units upon installation and every three years thereafter.

### **AIR QUALITY REVIEW**

A dispersion modeling analysis was completed on April 14, 2010, to assess the impact of particulate matter, sulfur dioxide, nitrogen oxide, and carbon monoxide emissions from the Clear Horizons, LLC (Waunakee Clean Energy Project) in the Town of Dane (Dane County) on ambient air quality. This analysis was performed in support of construction permit 10-SML-028.

The results demonstrate that the ambient air quality standards will be attained and maintained assuming the emission rates and stack parameters are correct in the application and in the construction of the source.

(b) It is estimated that White Gold Dairy will produce approximately 16,662,554 gallons of liquid manure, including parlor water, leachate collected and "first flush" feed storage pad runoff collected during the course of one calendar year. Approximately 18,615 cu ft. of solid manure will be produced from the calves. Nutrients for the manure generated for maximum animal numbers is 413,750 lbs. N and 155,875 lbs P<sub>2</sub>O<sub>5</sub> during the course of one calendar year. The White Gold Dairy expansion project is not proposing to discharge manure or parlor water to surface water or wetlands.

White Gold Dairy has 1,453 acres of cropland available for land spreading its manure. The dairy owns 190 acres, rents an additional 575 acres of cropland, and has 688 acres available through spreading agreements. Based upon the submitted nutrient management plan (NMP), White Gold Dairy has sufficient crop acres for the land application of manure. White Gold Dairy is exploring options to increase land base for land spreading. The proposed community digester plans to separate manure solids and sell the solids. White Gold Dairy would only receive digested liquid manure back from the digester. The objective of the digester is to remove 60% of the phosphorus from the manure. In the future, White Gold Dairy may consider using digested manure solids from the digester as bedding.

The farm does manure injection to minimize odors during land spreading. The farm has not received complaints of odors in the past. The proposed upgrades to White Gold Dairy are not expected to increase odors. With the manure being processed by a

digester, odors overall should be reduced; especially odors from land spreading.

## **Air Quality Impacts**

### **Ambient Air Emissions**

Livestock operations result in ambient air emissions. Sources of air emissions from livestock operations include the livestock themselves, manure handling and storage, land application of manure, as well as vehicles and vehicle traffic, grain and feed handling, grain drying, grain storage, feed milling, feed storage, fertilizer and pesticide handling and application. The most commonly noted form of air pollution associated with livestock operations is odor. In addition, livestock operations result in air emissions of particulate matter and various hazardous air pollutants, especially hydrogen sulfide and ammonia.

In 2003, the National Academy of Sciences (NAS), National Research Council, published a comprehensive report, "Air Emissions From Animal Feeding Operations: Current Knowledge, Future Needs." The key findings relevant to this assessment include the following: 1) Standardized methodologies for odor measurement have not been adopted in the United States, and 2) Estimating air emissions from animal feeding operations by multiplying the number of animal units by existing emission factors is not appropriate for most substances. As noted in this report, the existing emission factors for animal feeding operations are generally inadequate because of limited numbers of measurements on which they are based, as well as the limited generality of the models for which the emission factors have been developed. The NAS recommends that the science be strengthened, that a standardized odor measurement methodology be adopted, and that a process-based emissions estimation methodology be developed.

In response to these findings and recommendations, the United State Environmental Protection Agency (US EPA) has initiated a national effort to develop an emissions estimation methodology for animal feeding operations, through US EPA's Animal Feeding Operation Air Quality Compliance Agreement. Emissions monitoring will occur at farms that sign on to the agreement. These farms will represent major animal groups (e.g. swine, dairy, and poultry), different types of operations, and different geographic regions. The sign-up period for this agreement ended in August 12, 2005. The monitoring study, expected to end in 2009, will provide US EPA with the essential data needed to develop emissions estimating methods and tools, which will assist the industry and US EPA in determining the air impact and compliance status of animal feeding operations. US EPA is required to publish the methodology and tools for estimating emissions within 18 months of the end of the monitoring study. Under the current timeline for study completion, the methodology would be published in January 2011. Animal feeding operations will then be required to determine their emissions and comply with all applicable regulatory requirements. Pollutants to be monitored include particulate matter (PM) (TSP, PM10 and PM2.5), hydrogen sulfide (H<sub>2</sub>S), volatile organic compounds (VOCs), and ammonia (NH<sub>3</sub>).

In the interim, a limited number of other states have adopted methodologies to evaluate the potential air impacts of livestock operations. For example, the Minnesota Pollution Control Agency (MPCA) has adopted an air quality impact analysis methodology. The MPCA environmental assessment methodology for livestock operations is established in law and is supported by guidance materials developed by the MPCA as part of their environmental assessment program. The Department has not adopted this methodology and does not typically conduct analysis of air emissions from CAFOs. Instead, the Department has made a conscious decision to coordinate its work in this area with the outcome of the national monitoring effort described above.

### **Odor**

As noted above, standardized methodologies for odor measurement have not been adopted in the United States. The Department has not adopted a methodology to predict the potential odor impact of proposed livestock operations. Thus, a quantification of predicted odor impact of the proposed project is not included in this assessment. Wisconsin's odor rule is established in s. NR 429.03, Wis. Adm. Code. This rule establishes general limitations on objectionable odor, defines the tests for what constitutes objectionable odor, and sets abatement or control requirements.

The operation will be applying for local approval of its proposed expansion and submitted an odor management worksheet as part of the local approval process in accordance with a local ordinance and ch. ATCP 51, Wis. Adm. Code. As part of this process, an odor management worksheet and supporting documentation will be submitted to the town. The operation will be identifying odor control practices as part of its application for local approval.

Note: Odor from land applied manure should be reduced because of required incorporation timing, or applications to actively growing crops, as commonly required in all NMP.

### **Particulate Matter & Fugitive Dust**

As noted above, a national effort to develop an emissions estimation methodology for animal feeding operations is underway, as established with the US EPA Animal Feeding Operation Air Quality Compliance Agreement. The monitoring protocol includes

measurement of particulate matter (TSP, PM10, and PM2.5). Wisconsin's fugitive dust rule, s. NR 415.04, Wis. Adm. Code, establishes general limitations on fugitive dust and sets specific precautions for limiting fugitive dust emissions. Ambient air quality standards for particulate matter are established in s. NR 404.04, Wis. Adm. Code. These standards are established at levels protective of public health and welfare. The primary standards for PM10 are 150 micrograms per cubic meter - maximum 24-hour concentration not to be exceeded more than once per year, and 50 micrograms per cubic meter - annual arithmetic mean. The secondary standard for total suspended particulate matter is 150 micrograms per cubic meter - maximum 24-hour concentration, not to be exceeded more than once per year. An ambient air quality standard for fine particulate matter (PM2.5) has been established at the federal level. The federal PM2.5 standards are 15.0 µg/m<sup>3</sup>, annual arithmetic mean, and 35 µg/m<sup>3</sup>, 24-hour average. As of this writing, there are no particulate matter non-attainment areas in Wisconsin.

Dust from gravel driveway may be generated during periods of construction and routine traffic and can be controlled with the implementation of a watering program.

#### Hazardous Air Pollutants:

As noted above, a national effort to develop an emissions estimation methodology for animal feeding operations is underway, as established with the US EPA Animal Feeding Operation Air Quality Compliance Agreement. The monitoring protocol includes measurement of hazardous air pollutants, specifically hydrogen sulfide and ammonia.

In Wisconsin, hazardous air pollutant emissions are regulated under ch. NR 445, Wis. Adm. Code. This rule establishes ambient air standards for specific hazardous air pollutants, off the source's property. The criteria for determining which pollutants are regulated and how the standards are established is set in s. NR 445.13, Wis. Adm. Code. The criteria include conditions based on determinations by the International Agency for Research on Cancer, the National Toxicology Program, the American Conference of Governmental Industrial Hygienists, and the US EPA.

An updated version of ch. NR 445, Wis. Adm. Code, was published on July 1, 2004. The updated version of this rule provides a 36 month exemption for livestock operations, from July 2004 to June 2007. The Department is in the process of extending the exemption period through July of 2011 to account for studies underway at the federal and state levels which will advance our understanding of livestock operation air emissions and best management practices (BMPs). As described above, US EPA is working to create an emissions estimation methodology for animal production areas through its Animal Feeding Operation Air Quality Compliance Agreement. In addition, the Department is working with other state agencies and organizations to study the effectiveness of various BMPs at animal production areas to control emissions and odors from a number of livestock operations across the state. The results of these studies will help support implementation of the NR 445 requirements. After this exemption period, new livestock operations are required to comply upon start up and existing livestock operations will have an additional 12 months to comply. The rule provides several compliance options, including demonstration of compliance via dispersion modeling analysis. A special compliance option for livestock operations is established in the updated rule, specifically, the implementation of BMPs as approved by the Department.

As stated in a note within s. NR 445.08(3)(c), Wis. Adm. Code, NR 445 was not developed with the purpose of regulating emissions of hazardous air contaminants associated with agricultural waste or byproducts. The Department believes that using BMPs is the preferred approach to regulate and control emissions from these types of sources.

Over the past several years, in response to complaints about air pollution associated with livestock operations, the Department has conducted a limited amount of ambient air monitoring for hazardous air pollutants near a variety of livestock operations. The monitored concentrations have not exceeded the acceptable ambient concentration standards established in ch. NR 445, Wis. Adm. Code. As established in ch. NR 445, Wis. Adm. Code, the acceptable ambient concentration for ammonia and hydrogen sulfide are 418 and 335 micrograms per cubic meter, respectively, both on a 24-hour average basis, per. ch. NR 445. The Department continues to engage in ambient monitoring for these compounds at livestock operations.

The Air Management program requested and received authority from the Natural Resources Board to address toxic air emissions from agricultural waste. The process to address these agricultural air emissions will include two steps. First, an advisory group of technical and operational experts as well as environmental advocates and health experts will review current information and practices and develop recommended BMPs for agricultural waste emissions. Advisory group members, meeting dates, agendas, notes, and associated material, as well as products from the meetings, are posted at <http://dnr.wi.gov/air/agWaste.html>. Second, after the BMPs have been identified, DNR will develop an implementation process which is expected to include Administrative Rules.

## 8. Other Changes

None.

9. Identify the maps, plans and other descriptive material attached

Attachment A1: Manure and Wastewater Data

Attachment A2: UW Extension letter re: Determining Nutrient Availability

Attachment A3: UW Extension paper re: Evaluation of Nitrogen Availability from Raw and Digested Dairy Manures

Attachment B: Site Map: Aerial Photo Showing Digester Site and Three Participating Farms

Attachment C: Aerial Photo: Topographic Map Showing Digester Site and Three Participating Farms

Attachment D: Aerial Photo: Plat Book Map Showing Digester Site and Three Participating Farms

Attachment E: Aerial Photo: Wetland Map Showing Digester Site and Three Participating Farms

Attachment F: Aerial Photo: Soils Map Showing Digester Site and Three Participating Farms

Attachment G: Landspreading Plan – Dane Co. Digester Project – Clear Horizons Dane (May 10, 2010)

Attachment H: Soil Test Summary

Attachment I: Montgomery Associates Memo

Attachment J: Design Report – Clear Horizons Dane Project (March 31, 2010)

Attachment K: White Gold Dairy site plan

Attachment L: Draft Non-Point Source Modeling Report cover page and page 7-58. - Montgomery Associates (May 2010)

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AFFECTED ENVIRONMENT (describe existing features that may be affected by proposal)

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10. Information Based On (check all that apply):

Literature/correspondence (specify major sources)

Strand Associates, Inc. “Report: Community Manure Management Facilities Plan”. Dane County, WI. March 2009.

Penn State, College of Agriculture Sciences-Cooperative Extension. “Anaerobic Digestion: Biogas Production and Odor Reduction from Manure”. Retrieved from <http://www.age.psu.edu/extension/factsheets/g/G77.pdf> on April 26, 2010.

*Lake Mendota Watershed Priority Report*. Dane County, WI. June 2000.

McGinley, Paul. “Field-Scale Influences on Runoff phosphorus Loss from Alfalfa”. University of Wisconsin-Stevens Point. September 2004.

Struss, Ron. “The 500 lbs Algae Adage. Where did it come from—and is it true?”. University of Minnesota Extension Service. July 2003. Retrieved from [http://www.cleanwatermn.org/app\\_themes/cleanwater/pdfs/forTeachers/Algae.pdf](http://www.cleanwatermn.org/app_themes/cleanwater/pdfs/forTeachers/Algae.pdf) on May 12, 2010.

Personal Contacts (list in item 26)

Field Analysis By:  Author  Other (list in item 26)

Past Experience With Site By:  Other (list in item 26)

11. Physical Environment (topography, soils, water, air)

(a) During construction, soil will be stockpiled on-site for use. The site is designed to balance the required cut and fill so the source of fill will be the cut on the east side of the proposed location. The operation will require coverage under a DNR WPDES storm water construction permit.

The facility site is located 300' east of an intermittent unnamed stream. This intermittent stream flows approximately 11,175 feet to the nearest perennial stream, Six Mile Creek. No subsurface drainage tiles or ditches are being proposed. To control storm water on the facility site, one dry pond and three bio-retention ponds are proposed.

Land spreading is proposed to take place in the Yahara River and Lake Mendota Watershed, the Six Mile and Pheasant Branch Creeks Watershed and the Lake Wisconsin Watershed. Land spreading fields are located approximately 18,925 feet from Spring Creek, 7,900 feet from Dorn Creek, and 5,000 feet from Six Mile Creek, all perennial streams. The byproduct returned to the participating producers for land spreading will be reduced in phosphorus by 60 percent. Due to this reduction in phosphorus in the land spread material, the amount of phosphorus making its way into surface water through runoff from participating farms is 8 percent. This information was obtained through SNAP-Plus modeling using current rotations, land use practices, as well as current fertilizer applications and spreading rates.

(b) There are no apparent mapped floodplains in the project area according to WDNR Surface Water Data Viewer – Floodplain Theme. There is an intermittent stream adjacent to the west side of the proposed project site. There are no plans to disturb the stream.

The permittee has applied for a DNR permit under Wis. Statutes Ch. 30 to grade an area near the intermittent stream as part of the proposed expansion.

There is an intermittent stream adjacent to the west side of the proposed project site. This intermittent stream flows to Six Mile Creek, approximately 9,500 ft downstream. The only Outstanding or Exceptional Resource Waters in proximity to the farms or lands that spreading will occur on is Six Mile Creek. This was determined by using field locations provided by Agronomist Company and the DNR-Surface Water Viewer website.

A drain tile is planned to be installed around the proposed 320 ft dia. manure storage basin to prevent potential hydrostatic loads on the concrete wall of the basin. Ditches will be constructed in the manure storage basin area and proposed free stall barn area to direct storm water. Manure or digestate will be land spread on fields within the Six Mile and Pheasant Branch Creeks Watershed, the Yahara River and Lake Mendota Watershed, and the Lake Wisconsin Watershed.

12. Biological Environment (dominant aquatic and terrestrial plant and animal species and habitats including threatened/endangered resources; wetland amounts, types and hydraulic value)

(a) The specific aquatic species currently present in the water bodies affected by construction or land spreading is not known. (Six Mile Creek (site and land spreading), Spring Creek and Dorn Creek (both land spreading))

There is no threatened or endangered plant or animal species at the facility site. The nearest threatened species located by the National Heritage Inventory is within 1 mile: *Gentianopsis procera*, Lesser Fingered Gentian (per correspondence with DNR).

There will not be any terrestrial or aquatic habitats affected nor will plant or animal species be affected by the project as the site is currently agricultural cropland, which is disturbed throughout the growing season by agricultural production.

(b) The specific aquatic species currently present in the water bodies near the White Gold Dairy is not known

It is believed that this area would continue to provide habitat for common animal species acclimated to farms. In viewing the WDNR Natural Heritage Inventory website and viewing the Endangered Resources Map for Dane County; the Farm Expansion site does not indicate the presence of endangered resources.

13. Cultural Environment

a. Land use (dominant features and uses including zoning if applicable)

(a) Agriculture cropland, zoned for agricultural uses

**(b)** According to White Gold Dairy; the site is currently zoned agricultural and we understand changes in zoning are not needed. Farmland is the dominate land use adjacent to the area of the project. Changes in land use are not anticipated.

b. Social/Economic (including ethnic and cultural groups)

**(a)** The closest homes to the proposed site are owned by the participating producers. There are approximately six to eight homes on Cuba Valley Road to the northeast of the site, approximately one half mile away. Nearby homeowners will benefit from the reduction in odor of land spread manure. There will be an improvement in area surface water quality through the reduction of phosphorus in the watershed and an improvement in air quality due to the methane capture for renewable energy. Organic nutrients will help improve soil quality while helping to limit commercial fertilizer purchases.

**(b)** According to the Wisconsin Milk Marketing Board, approximately \$2,300 per cow is made available to the local economy and for every new agricultural job created, 1.3 jobs are added to the state of Wisconsin employee base. This would be \$2,300 dollars for each of the milk cows (520 additional milking cows) which totals approximately \$1,196,000 that will be contributed to the local economy. With increased markets and economic activity in the area, and increased investment in the farm, overall farm and community property values are expected to stay the same or increase. This project is also expected to increase the tax base for local schools and the community.

The farm employs 12 full-time employees, which includes 4 family members. Two additional employees are considered to be hired for the expansion.

It is believed the local farm people and rural residents are supportive of agriculture in the community. No controversy is anticipated over the proposed expansion. Up to this point, the farm has been milking 660 cows with no opposition or complaints.

c. Archaeological/Historical

**(a)** Clear Horizons Dane is not aware of any archaeological or historical landmarks present on site

**(b)** White Gold Dairy is not aware of any archeological or historical settings located near the site.

14. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

**(a)** No State Natural Areas are in or adjacent to lands operated in cooperation with the Dane County MHF as determined by viewing the WDNR State Natural Area Map Viewer.

**(b)** No State Natural Areas are in or adjacent to lands operated by White Gold Dairy, this was determined by viewing the WDNR State Natural Area Map Viewer. According to the USDA/NRCS Web Soil Survey some of the land that the new Farm Expansion site is proposed on is classified as Prime Farmland, however, this land will remain in agricultural land use.

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ENVIRONMENTAL CONSEQUENCES (probable adverse and beneficial impacts including indirect and secondary impacts)

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15. Physical (include visual if applicable)

**(a)** There will be an increase in impervious surface as a result of the project totaling 126,907 square feet. As a means of reducing site storm water runoff, one dry pond and three bio-retention ponds will be installed. The dry pond is approximately 8,800 square feet and the bio-retention ponds are over 9,500 square feet, collectively.

No terrestrial or aquatic resources will be disturbed during construction, nor will they be negatively impacted as a result of the proposal. Minor visual impacts will occur from the digester building, but this should not be significant considering the presence of other existing buildings within close proximity.

Over the last 30 years, several models have been developed to estimate the total phosphorus loadings to Lake Mendota. These estimates vary widely due to the time period, types of data used, and assumptions each one is based on. This makes direct comparisons difficult. Currently, additional analysis is being completed to refine the total phosphorus load estimates into Lake Mendota.

Study	Estimated phosphorus load delivered to Lake Mendota
1975: Framework for Lake Management	92,200 lbs/year
2000: Priority Watershed Project	72,275 lbs/year
2010: SWAT (calibrated) 1995-2008	45,135 lbs/year
Average of data from 2 gauging stations for 1995 – 2008 applied to the whole watershed	66,296 lbs/year

One of the benefits of the proposed project is the reduction in phosphorus loading to the Yahara chain-of-lakes as follows:

1) The Dane County MHF has a 15-year contract with a private distributor to take the by-product (digested, centrifuged solid manure) that contains at least 60% of the phosphorus and export it out of the Lake Mendota watershed. This will result in the removal of 68,000 lbs or 34 tons (60% of total phosphorus load from the 3 farms in 2012) of phosphorus each year. Removing this phosphorus before the digestate is transferred to the farms will help reduce the amount of phosphorus that is applied to the land. Analysis of this impact is addressed in the sections that follows and in Section 21.

2) Reduction of phosphorus from the soil profile on these 3 farms. According to Laura Ward Good, PhD, Wisconsin Phosphorus Index and Snap-Plus Project Coordinator, Department of Soil Science, University of Wisconsin-Madison, “Soil Phosphorus levels will decline with the Dane County MHF in operation, without it, soil phosphorus will continue to increase”. Research shows that excessively high phosphorus soils discharge 4 times the rate compared to soil phosphorus loss from “optimum” phosphorus level soils (McGinley 2004). According to University of Wisconsin recommendations, optimum phosphorus levels are 30 ppm, excessively high phosphorus soils are 100 ppm and over. All 3 farms have between 32%-59% of fields with high (50-100 ppm) to excessively high (100-200+ ppm) phosphorus soils (see attachment H).

3) Nutrient Management Planning that prioritizes the reduction of soil phosphorus on those fields with high to excessively high phosphorus levels and allows the nutrient build up of phosphorus on soils that are at a less than optimum level. The NMP also addresses application issues in a Land Spreading Plan (see attachment G). The plan prohibits manure or digestate application on frozen or snow-covered ground and requires that all fields be planned to meet a Phosphorus Index (PI) of 6 or less throughout the rotation and no field may have an annual PI of 10 or more. It is a goal of this project to prevent an increase in the rotational PI of any field. The plan also addresses solid manure applications and has emergency provisions. This plan is more restrictive than current local, state and federal rules.

4) The Soils Nutrient Application Planner (SNAP-Plus) model was used to determine the phosphorus runoff to the nearest surface water “before” and “after” the Dane County MHF is implemented in the table below. Manure production, land acreage for spreading, and land use information from 2010 was used to determine the values in the column labeled “Phosphorus Load with Raw Manure”. The manure analysis was changed to reflect the impact of the digester phosphorus removal in the column labeled “Phosphorus Load with Digestate”. Subtraction of the second column values from those in the first column resulted on the Phosphorus Load Reduction column. Breakdown by participating farm is as follows:

**Analysis of Phosphorus Index load after the first year of soil test Phosphorus drawdown with use of digestate exclusively.**

	Phosphorus Load with Raw Manure	Phosphorus Load with Digestate	Phosphorus Load Reduction
Ripp Farm (1836 acres)	4,904 lbs annually	4,537 lbs annually	367 lbs annually
White Gold Dairy (Maier) (1447 acres)	4,500 lbs annually	4,000 lbs annually	500 lbs annually
Endres Farm (286 acres)	2,072 lbs annually	1,148 lbs annually	924 lbs annually
Total	11,476 lbs annually	9,685 lbs annually	1,791 lbs annually

This analysis for phosphorus load reduction was completed based upon 2010 Nutrient Management Plans using the Snap-Plus Model. SNAP-Plus is a field scale model and estimates phosphorus delivery to the nearest surface water. It does not estimate phosphorus delivery to Lake Mendota. This model indicates an annual phosphorus load reduction of 1,791lbs (15.6%) to surface waters from these 3 farms due to operation of the digester system.

A long-term SNAP-Plus analysis was also run to try and project the effects of lowering soil test phosphorus levels over 20 years. This run showed a potential reduction of an additional 400 pounds per year to 2,193 pounds. In order to complete this analysis several assumptions were made: the decrease in soil test phosphorus levels over the 20 years would not go below 18 parts per million, only digestate would be applied by the participating farms and the crop rotations on these farms would remain the same over the 20 years.

These annual phosphorus reductions could be less than projected due to the addition of supplemental phosphorus as allowed in the Land Application Plan (Attachment G). In addition, other crop rotations, expansions, changing the fields used for application, could all result in more phosphorus discharged to surface waters than projected. These were not factored into the above analyses.

Other factors could also result in greater annual phosphorus reductions than projected, for example, changes in crop rotations, improved centrifuge efficiency and lower phosphorus inputs.

Another modeling effort estimates the reduction of phosphorus loading **directly** to Lake Mendota from the participating farms would be approximately 500 pounds. This represents an 11 % phosphorus reduction from the 3 farms due to operation of the digester system. This also represents 1% of the total load entering Lake Mendota annually (45,000 lbs) from all sources, agricultural and urban. This reduction and annual load estimate was made using the Soil and Water Assessment Tool (SWAT) model (see attachment I). SWAT is an internationally used basin-wide model and is not meant to be used at the farm field scale. It uses uniform runoff parameters for 2-5 square mile sub-basins or Hydrologic Response Units. Additionally, the current SWAT model doesn't adequately calculate winter runoff. The UW-Madison is working with the model's developers at Texas A & M University to adjust the winter runoff portion of the model. Since the winter runoff isn't adequately accounted for, it would be expected that the SWAT model would underestimate the phosphorous reduction to Lake Mendota.

In a previous study, "The Nonpoint Source Control Plan for the Lake Mendota Priority Watershed Project" dated June, 2000, indicated the need to reduce the phosphorous loading by 51% or about 37,000 lb of phosphorus per year. Based on that study, the 1,791 lb of phosphorous reduced by the Dane County MHF represents about 5% of the total phosphorus load reduction to the Lake needed from all sources, agricultural and urban (37,000 lbs). At build-out capacity (8,000 animal units) this reduction could reach 10% of the total load reduction needed if the additional manure was produced by cows that currently exist in the watershed. However, if manure from livestock new to the watershed is added to the digesters the estimated phosphorus load reduction will decrease. For example, if manure from roughly 800 animal units new to the watershed were added to the digesters, the phosphorus load reduction to the Lake due to the digesters would be 0%. The same increase in animal units in another part of the watershed (not served by this project) would not be able to take advantage of its phosphorus removal and landspreading restrictions and, therefore, would result in additional loading to Lake Mendota.

There are approximately 45,000 animal units on about 250 livestock operations in the Lake Mendota drainage area. The Dane County MHF will initially serve three farms with 4,000 animal units with the possibility of doubling the number of animal units to nearly 8,000. This project does not specifically restrict the number of animal units in the project area, which could dramatically affect the overall benefits of this project. Any additional digestate produced would be subject to the land application restrictions as contained in the Landspreading Plan, Attachment G. The ability to get suitable land could limit expansions.

Alone, the Dane County MHF is unlikely to significantly affect Lake Mendota's water quality. Additional phosphorous reduction practices are needed to improve Lake Mendota's water quality.

**(b)** There will be an increase in animal units within the watershed due to the expansion of White Gold Dairy. Though there will be a significant increase in manure production on the White Gold Dairy farm, the manure will be treated at the Dane County MHF, reducing the impact of the expansion on the environment. The expansion will result in an increase in impervious surface as multiple buildings will be constructed from 2010 to 2013.

16. Biological (including impacts to threatened/endangered resources)

**(a)** No endangered plant or animal species are located on-site. The closest threatened plant species is *Gentianopsis procera*, Lesser Fingered Gentian, but is not found on the proposed site (per correspondence with DNR). It is unknown if there are any

threatened animals within close proximity to the facility site.

**(b)** It is believed that this area would continue to provide habitat for common animal species acclimated to farms. In viewing the WDNR Natural Heritage Inventory website and viewing the Endangered Resources Map for Dane County; the Farm Expansion site does not indicate the presence of endangered resources.

17. Cultural

a. Land Use (including indirect and secondary impacts)

**(a)** The area of the proposed project is agriculture in nature and is zoned for agriculture use.

All participating landowners will be required to have a NRCS 590 NMP approved annually by the Dane County Land Conservation Department and will be required to comply with the Landspreading Plan – Dane Co. Digester Project (see Attachment G).

**(b)** The land will continue to be used for agriculture purposes. White Gold Dairy has submitted a permit-required NMP and will comply with the Landspreading Plan – Dane Co. Digester Project (see Attachment G).

b. Social/Economic (including ethnic and cultural groups, and zoning if applicable)

**(a)** Area residents will see an increase in traffic on Cuba Valley Road as it is anticipated that the project will require two to four semi-trucks entering and leaving the site daily as well as a daily service truck. There will also be an increase in noise and traffic during construction.

The economy of the local community will be directly impacted through various avenues. The majority of the work performed during construction will be from local contractors. It is estimated that approximately \$2 million will be required from local contractors to perform the work. In addition, the land will be purchased from one of the participating farms. During construction, those contractors not local to the site will stay in the local hotels, eat at the local restaurants, and shop at the local convenience stores, hardware stores, and grocery stores. The completed facility will employ one to two operators.

This project will use a total of \$3,300,000 of taxpayer funds for the construction of this digester system. The money will come from the following sources:

1 Wisconsin Department of Administration (DOA)

2 Dane County (\$180,000 Strand Associates, INC. Community Manure Management Facilities Plans) and in-kind services

**(b)** This project will increase the tax base for local schools and the community. Organic nutrients will help improve soil quality while helping to limit commercial fertilizer purchases.

According to the Wisconsin Milk Marketing Board, approximately \$2,300 per cow is made available to the local economy and for every new agricultural job created, 1.3 jobs are added to the state of Wisconsin employee base. This would be \$2,300 dollars for each of the milk cows (520 additional milking cows; which totals to approximately \$1,196,000 that will be contributing to the local economy. With increased markets and economic activity in the area, and increased investment in the farm, overall farm and community property values are expected to stay the same or increase.

The farm employs 12 full-time employees, which includes 4 family members. Two additional employees are considered to be hired for the expansion.

c. Archaeological/Historical

**(a)(b)** No archaeological or historical landmarks are present on either site

18. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

**(a)** No State Natural Areas are in or adjacent to lands operated in cooperation with the Dane County MHF

**(b)** No State Natural Areas are in or adjacent to lands operated by White Gold Dairy, this was determined by viewing the WDNR State Natural Area Map Viewer. According to the USDA/NRCS Web Soil Survey, some of the land that the new Farm Expansion

site is proposed on is classified as Prime Farmland, however, this land will remain in agricultural land use.

19. Summary of Adverse Impacts That Cannot Be Avoided (more fully discussed in 15 through 18)

**(a)** There will be an increase in construction traffic as well as additional traffic daily for maintenance of the facility. Semi-trailers will be entering and exiting the area to transport the solid byproduct from the digester to areas outside of the watershed.

**(b)** There will be an increase in construction traffic during expansion and additional traffic to transport products produced on the farm.

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DNR EVALUATION OF PROJECT SIGNIFICANCE (complete each item)

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20. Environmental Effects and Their Significance

a. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are long-term or short-term.

**(a)** The four main consequences resulting from the project are increased impervious surface, increased traffic, reduced phosphorus loading to Lake Mendota and reduced greenhouse gas (GHG) emissions from participating farms. Though the increase in impervious surface will be long-term, steps will be taken to reduce runoff, including the installation of a dry retention pond and three bio-retention ponds. The increase in traffic will be significant during construction but reduce in significance as the project nears completion. There will be daily semi-truck traffic as the solids from the digester will be transported out of the watershed. There will also be a maintenance vehicle visiting the site daily. Reduced phosphorus loading to Lake Mendota and reduced GHG emissions will benefit the environment for the life of the digesters (approx. 20 years). It is hoped that at the end of the life of the digesters, there will be additional funding for reconstruction to maintain the phosphorus reduction.

**(b)** The main consequence of the White Gold Dairy expansion is the increase in manure production in an already dairy intensive area. Due to the Dane County MHF proposal, the impact of the additional manure will be reduced as 60 percent of the phosphorus produced from the expansion will be removed by separation and removed from the watershed. Reduced phosphorus loading to Lake Mendota and reduced GHG emissions will benefit the environment for the life of the digesters (approx. 20 years). The amount of impervious surface will be increased with the addition of multiple freestalls and other buildings. The impact of impervious surfaces is long-term.

b. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are effects on geographically scarce resources (e.g. historic or cultural resources, scenic and recreational resources, prime agricultural lands, threatened or endangered resources or ecologically sensitive areas).

**(a)(b)** none

c. Discuss the extent to which the primary and secondary environmental effects listed in the environmental consequences section are reversible.

**(a)** The impervious surface is rather permanent, but is being mitigated through the construction of a dry pond and three bio-retention ponds.

**(b)** The impervious surface, though rather permanent, can be mitigated through retention ponds as planned for the Dane County MHF. The animal numbers may be reduced in the future, but is unlikely due to the input costs to construct facilities to house the additional animal units.

21. Significance of Cumulative Effects

Discuss the significance of reasonably anticipated cumulative effects on the environment (and energy usage, if applicable). Consider cumulative effects from repeated projects of the same type. Would the cumulative effects be more severe or substantially change the quality of the environment? Include other activities planned or proposed in the area that would compound effects on the environment.

**(a)** Multiples of the proposed project would have positive affects on the environment with the reduction in soil phosphorus, reductions in methane released into the atmosphere, as well as other harmful gases.

Phosphorus in the watershed will be reduced over time as over 68,000 lbs of phosphorus from the three farms (3% of the

phosphorus applied annually) will be removed each year through the solid separation process. Annual land application of phosphorus to the watershed amounts to 2,350,000 lbs. (See Attachment I) If steps to remove phosphorus from the watershed are not taken, soil phosphorus will continue to increase over time, eventually causing an increase in phosphorus losses to surface waters (per correspondence with Laura Ward Good, UW-Madison). The reduction of phosphorus making its way to Lake Mendota will reduce the amount of algae present each year. It is estimated that for each pound of phosphorus that enters surface water, 500 lbs of algae will be produced (Struss 2003 (see item 10, p. 7)). This equates to approximately an 895,000 lb reduction of algae in the surface water system.

Estimates using the SNAP-Plus model show that operation of the digester system will initially remove approximately 1,791 lbs of phosphorus from entering waters of the state from participating farms annually (see EA section 15). A long-term SNAP-Plus analysis was also run to try and project the effects of lowering soil test phosphorus levels over 20 years. This run showed a potential reduction of an additional 400 pounds per year to 2,193 pounds. In order to complete this analysis several assumptions were made: the decrease in soil test phosphorus levels over the 20 years would not go below 18 parts per million, only digestate would be applied by the participating farms and the crop rotations on these farms would remain the same over the 20 years.

Alternatively, another analysis using the SWAT model estimates phosphorus reduction to Lake Mendota from the digester system at 500 lbs annually. This represents an 11% phosphorus reduction from landspreading practices at participating farms without operation of the digester system (4,447 lbs) and a 1% phosphorus reduction from phosphorus entering the Lake from all sources (45,000 lbs/year). If similar projects were installed over time, each project could be expected to reduce phosphorus loading to Lake Mendota by an additional 1- 4 percent annually, provided other factors remained constant. By removing phosphorus from the waste farmers will landspread, the digester system will provide farmers with a crop nutrient source that better aligns with crop needs (per correspondence with Dave Fisher, UW-Extension). The Dane County MHF will reduce phosphorus levels of incoming waste by 60%, thus assisting in the reduction of high soil phosphorus levels on participating farm fields, which contributes to high phosphorus levels in runoff to Lake Mendota.

In a previous study, "The Nonpoint Source Control Plan for the Lake Mendota Priority Watershed Project" dated June, 2000, indicated the need to reduce the phosphorous loading by 51% or about 37,000 lb of phosphorus per year. Based on that study, the 1,791 lb of phosphorous reduced by the Dane County MHF represents about 5% of the total phosphorus load reduction to the Lake needed from all sources, agricultural and urban (37,000 lbs). At build-out capacity (8,000 animal units) this reduction could reach 10% of the total load reduction needed if the additional manure was produced by cows that currently exist in the watershed. However, if manure from livestock new to the watershed is added to the digesters the estimated phosphorus load reduction will decrease. For example, if manure from roughly 800 animal units new to the watershed were added to the digesters, the phosphorus load reduction to the Lake due to the digesters would be 0%. The same increase in animal units in another part of the watershed (not served by this project) would not be able to take advantage of its phosphorus removal and landspreading restrictions and, therefore, would result in a additional loading to Lake Mendota.

There are approximately 45,000 animal units on about 250 livestock operations in the Lake Mendota drainage area. The Dane County MHF will initially serve three farms with 4000 animal units with the possibility of doubling the number of animal units to nearly 8,000. This project does not specifically restrict the number of animal units in the project area, which could dramatically affect the overall benefits of this project. Any additional digestate produced would be subject to the land application restrictions as contained in the Landspreading Plan, Attachment G. The ability to get suitable land could limit expansions.

Alone, the Dane County MHF is unlikely to significantly affect Lake Mendota's water quality. Additional phosphorous reduction practices are needed to improve Lake Mendota's water quality.

The Dane County MHF will decrease the amount of methane released into the atmosphere from animal waste and convert it to energy – enough to power 2,500 homes. With the digestion process, odors are also reduced if the system is properly maintained. By providing power to 2,500 homes, it is important to note that the digester system is not just about phosphorus reduction. Clustering of digesters would reduce the amount of energy needed to power homes in the Lake Mendota drainage area. This will provide the dual benefits of phosphorus reduction and energy production.

**(b)** If additional expansions of this size occurred in close proximity, the amount of manure produced could be detrimental to the environment unless a digester was available to process the raw manure.

22. Significance of Risk

a. Explain the significance of any unknowns that create substantial uncertainty in predicting effects on the quality of the environment. What additional studies or analysis would eliminate or reduce these unknowns?

**(a)** The main project unknown is found in the analysis as much of it is based on models. Each model holds its own assumptions and uncertainties. Dane County will use this project as an opportunity to explore alternative monitoring options to track the model's predictions over time. Dane County has applied for a grant to install monitoring devices in the proximity of the digester farms to verify SNAP Plus prediction. The Digester is one way to reduce risks associated with current ongoing nonpoint source efforts such as changes in tillage practices and rotations. What farmers agree to do with the digester project is not self-adjustable like the current nonpoint practices in place today.

**(b)** Current regulations require that there be no discharge of pollutants from any manure storage facilities, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, raw material storage areas, or other areas of the operation to navigable waters, except in the event a 25-year, 24-hour rainfall event, or a chronic rainfall event, causes a discharge of pollutants to navigable waters from a facility, structure or area which is properly designed for a 25-year, 24-hour rainfall event. In addition, current regulations prohibit 1) overflow of manure storage facilities, 2) direct runoff from a feedlot or stored manure to waters of the state, 3) unconfined manure piles/stacks in water quality management areas, and 4) unlimited access by livestock to waters of the state in locations where high concentrations of animals prevent maintenance of adequate sod cover.

The manure storage is scheduled for construction in the fall of 2010. The animal unit goal will be reached in 2012. Proposed manure storage and runoff control facilities at the operation will be built in accordance with currently accepted standards to minimize the risks of ground and surface water contamination. Plans and specifications for proposed facilities are being reviewed and will be approved by Department staff prior to construction.

Ensuring the manure storage facilities and runoff control systems meet currently accepted standards is intended to address possible adverse impacts to ground and surface waters. Once the proposed permit is issued, the operation will be required to obtain Department approval of all proposed new manure storage and runoff control facilities prior to construction to ensure that the facilities meet current standards.

The operation must comply with its WPDES permit and associated Manure Management Plan. Consequently, the landspreading of manure should not yield any substantial increase in risk to the environment. The Manure Management Plan will include acres that may not have previously been managed in accordance with a NMP, which could mean environmental benefits compared to existing manure application practices.

The nutrient content of manure temporarily stored in the storage facility may vary. Unidentified variations in nutrient content may result in over-application of nutrients (N in particular) that could impact groundwater. The WPDES permit issued to this operation will require manure and soil testing to ensure this does not occur.

b. Explain the environmental significance of reasonably anticipated operating problems such as malfunctions, spills, fires or other hazards (particularly those relating to health or safety). Consider reasonable detection and emergency response, and discuss the potential for these hazards.

**(a)** The permittee has submitted an Emergency Response Plan as part of their permit application to address actions that may be taken in the event of an emergency and includes emergency contact information. In addition, participants in this project have agreed to develop a plan to address emergency and land application of manure during other critical times. This will include a reserve capacity during the period of December 1 through May 1 of each year. The plan will also define the terms, fees, and conditions for manure going into the digester and digestate being returned to the farms. Please see Attachment G.

**(b)** Possible operating problems that could impact the environment include failure of manure handling and storage facilities, or poor manure land application practices that lead to nutrient runoff to surface waters, or leaching of nutrients to groundwater.

Department review of any proposed manure storage facilities or evaluation of existing manure storage facilities to ensure that they are appropriately designed (for example, berm slopes and storage volume) makes the probability of failure of storage facilities highly unlikely. In addition, the operation will need to address small-scale manure spills as part of their operation and maintenance plan for the operation (as part of the review process of manure storage facilities or as part of the proposed WPDES permit). This plan typically addresses spills associated with general operation and maintenance of the operation.

These small "spills" may not represent an immediate environmental impact but may need to be addressed by the operation (e.g., scraping areas where small amounts of "spilled" manure have collected, changing operating procedures to avoid small "spills") to ensure that impacts to waters of the state, primarily through runoff resulting from storm events, do not occur. Massive failure of the manure storage facility would likely be formally defined as a spill under Ch. NR 706, Wis. Admin. Code. Chapter NR 706 describes requirements for immediate notification of the Department in the case of a spill. A requirement to follow Ch. NR 706 is included in the proposed WPDES permit. Inappropriate or inadequate responses (i.e., time frame of response and action taken to eliminate or mitigate environmental impact) to spills and associated environmental impact are subject to Department enforcement. However, Department and permittee action is contingent on a case-by-case evaluation of actual environmental impact and correction actions taken by the operation.

Department inspections based on complaints or general compliance efforts will help to serve to evaluate whether the operation is properly addressing minor "spills." In addition, the operation will be required to conduct inspections of storage facilities to ensure that more significant problems are addressed prior to any sort of massive facility failure.

Manure will be landspread in accordance with a Department approved Manure Management Plan, which will not allow poor land application practices; thus, operating practices should have minimal impacts on the environment.

### 23. Significance of Precedent

Would a decision on this proposal influence future decisions or foreclose options that may additionally affect the quality of the environment? Describe any conflicts the proposal has with plans or policy of local, state or federal agencies. Explain the significance of each.

**(a)** Moving forward with this proposal will hopefully bring about the establishment of other digester systems servicing farms in the watershed of Lake Mendota. By so placing digesters in the Mendota watershed, it is anticipated that phosphorus reduction will benefit all of the lakes downstream. As the digester project is estimated to remove over 70,000 lbs of phosphorus (3% of phosphorus applied annually) from the watershed within its first year in operation, soil phosphorus levels will begin to decrease over time. An article focusing on phosphorus runoff from alfalfa fields (McGinley 2004 (see EA item 10.)) discussed study findings showing when soil phosphorus levels are around 110 ppm, the phosphorus runoff is four times higher as compared to fields with soil phosphorus levels of around 39 ppm, regardless of crop grown. With this being said, controlling phosphorus going into Lake Mendota cannot be solved entirely through current soil conservation practices, removal of phosphorus from the watershed must be accomplished to meet water quality goals.

This project is considered to be a first step in addressing a long standing problem of phosphorus in the lakes, which leads to blue-green algae and excessive algae growth in general. However, it should be noted that correcting this problem will take a dedicated commitment from the farming community, and investment through private and public sources.

**(b)** All future projects will be evaluated by their own specific adverse and beneficial impacts. There are over 200 permitted CAFOs in Wisconsin, including 7 in Dane County. Each individual project is considered separately based on its own merits.

In conducting this environmental assessment, the Department primarily considered issues that fall within its regulatory authority. White Gold Dairy will need to apply for and receive the appropriate approvals from all involved agencies prior to operating. Permitting this operation would not foreclose future options for taking necessary actions to protect the environment (i.e., revocation, modification of the permit). In actuality, through enforcement of the WPDES permit, the Department has a means to avoid or address possible environmental impacts associated with the operation.

### 24. Significance of Controversy over Environmental Effects

Discuss the effects on the quality of the environment, including socio-economic effects, that are (or are likely to be) highly controversial, and summarize the controversy.

**(a)** It is not anticipated that there will be opposition to improving water quality of the Yahara Lakes through this and potentially future projects. However, there will be a significant amount of resources expended to have a long-term positive impact on phosphorus concentrations in the lakes. This long-term affect will need a firm dedication by all parties involved. Sometimes this is best achieved by grassroots public involvement. Local government should encourage this to happen.

**(b)** There is the possibility that public controversy may be generated as a result of the permitting of this operation. State and area citizens may express concerns about the environment such as possible air and water quantity issues. The Department has some authority to address odor complaints should they arise. As noted in the sections above, the Department is starting a

process to study and address odor and air toxics issues from livestock operations on a statewide basis. This study is expected to develop standards and voluntary best management practices to reduce or minimize potential problems from CAFOs. Water quantity issues are addressed to a certain extent if the operation is required to obtain a high capacity well approval. However, neither of these issues is addressed by the issuance of the proposed WPDES permit, which is strictly intended to address the water quality concerns.

There may also be socio-economic concerns such as animal treatment issues, the trend towards large-scale farming in the state, potential impacts that larger-scale farming may have on the viability of smaller operations, and concerns of smaller operations and non-farming rural inhabitants regarding changes in the agricultural landscape associated with CAFOs. The socio-economic issues are difficult to quantify and there is significant disagreement as to the validity of these concerns. These socio-economic issues are beyond the scope of the proposed WPDES permit and the Department's overall regulatory authority. At this point, these issues can be addressed through local zoning and through implementation of comprehensive land use planning by the local unit of government.

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## ALTERNATIVES

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25. Briefly describe the impacts of no action and of alternatives that would decrease or eliminate adverse environmental effects. (Refer to any appropriate alternatives from the applicant or anyone else.)

- (a) This project began when Dane County decided to evaluate options for reducing phosphorous runoff in the agricultural industries. As part of the development of this project, Dane County performed two feasibility studies, Community Manure Management Feasibility Study (2008) and Community Manure Management Facilities Plan (2009). These studies evaluated several alternatives for manure and phosphorous management. Even though the total number of farms and cows in the currently proposed project is slightly different than what was assessed in the feasibility studies, many of the findings in the studies are still valid for this project. A brief description of the evaluated alternatives is given here.

### **Alternative 1: Do Nothing**

There are many areas within the Yahara Watershed that have high phosphorus levels in the soils. This has led to a high level of phosphorus runoff in the Yahara chain-of-lakes, contributing to algae blooms and other adverse effects.

The currently proposed project will remove significant amounts of phosphorus from manure being land applied in the Yahara Watershed, thus reducing phosphorus runoff into the lakes. The proposed project will also reduce greenhouse gas (GHG) emissions from these farms and create electricity, from a renewable energy source.

If this project does not happen, 100% of the phosphorus from the three farms identified will continue to be land applied, which will continue to contribute to phosphorus loading to the Yahara chain-of-lakes, the reduction in GHG emissions would not be achieved, and an opportunity to produce electricity would be lost.

### **Alternative 2: Other Technologies**

As part of the 2008 study, Dane County evaluated several technologies for manure solids destruction and stabilization, manure solids separation, and phosphorus removal and recovery from manure. This included a literacy review of available technologies and several site visits. A summary of the technologies reviewed and their feasibility on Dane County Farms can be found in Section 3-5 of the 2008 study.

The 2008 study looked at several technologies, including: anaerobic digestion, aerobic digestion, composting, combustion, pyrolysis, gasification, sand and grit separation, at least nine methods of manure solids separation, manure drying, phosphorus minimization in feeds, advanced phosphorus removal through chemical precipitation, and others.

The review looked at the feasibility of each technology, based on economics, technological reliability, and 18 non-monetary criteria, such as phosphorus reduction, water quality impacts, and air quality impacts. The review of all of the non-monetary criteria can be found in Section 5 of the 2008 study. The option to install treatment on individual farms was very costly. Ultimately, the 2008 feasibility study found that a community system, such as that proposed in this project, was more economical than a system at each individual farm. Additionally, the study concluded that the currently proposed project, anaerobic digestion, followed by advanced phosphorus removal, was the best option. This option is the most economical, and it also scored the highest in the assessment of environmental and other non-monetary criteria.

### **Alternative 3: Other Locations for a Community Digester**

The initial step in the 2008 Study was a survey of Dane County farms to determine farmer interest in participating in this project. Based on the farm responses, two clusters of farms were identified as potential sites. These clusters were chosen primarily due to their willingness to participate, but also due to their number and concentration of animals. The two farm clusters are in Middleton and Waunakee. This project will be at the Waunakee cluster. The Waunakee location was chosen over the Middleton location because, among other reasons, the Waunakee farmers are committed to a digester system, the economics are better due to a direct piping option, and there are increased environmental benefits. The environmental benefits are primarily due to reduced emissions from decreased manure trucking, because the Waunakee facility will have most of its manure delivered to the digester through pipes and the Middleton facility would require most of the manure to be trucked.

The 2009 Study was an in-depth evaluation of the project at the Waunakee site. Included in this study was an evaluation of potential facility locations near the participating Waunakee farms. Three potential locations were identified, and these can be seen on Figure 2.02-1 of the 2009 Study. A full analysis of the three sites can be found in Section 2.02 of the 2009 Study.

Site A would create the shortest trucking route for solids leaving the facility, but it would create the longest trucking route for manure being trucked in from some of the farms. In addition, this site would have the longest pipe runs, cause the greatest amount of land disturbance, and be located close to the stream that runs through this area. The pipes would also have to cross the stream.

Site B would also create a significant amount of land disturbance, because of site topography, and it would be located close to the stream.

Site C would create a relatively small amount of land disturbance, due to topography, and it would be located farthest from the stream.

The proposed site for this project is close to Site C, but it does extend partially into Site B. The chosen site will have the benefits of minimizing land disturbances, shortening piping runs, eliminating stream crossings, and maintaining sufficient distance from the stream.

#### **Alternative 4: Smaller Facility**

Another option would be to construct a smaller facility. This would have the advantage of less land disturbance. However, it would not reduce emissions or phosphorous to the same degree and would not allow for as much manure to be treated and would reduce the reserve capacity available for emergency situations and limiting winter applications. Also, this option is not economically feasible due to economies of scale. This was evaluated and fully explored in the 2008 Study.

#### **Alternative 5: Larger Facility**

A larger facility would have the negative impact of increased land disturbance, but it would increase the reduction of phosphorous and GHG emissions. However, a larger facility would require additional manure, which is not currently available at this site. Additional manure with the current situation would require manure from farther farms to be trucked to the site, thereby increase trucking emissions. There are provisions in the project planning to allow for additional manure to be treated. This would result in additional digesters being constructed. Additional manure could also be generated from expanding farms in the area or at the project farms. This would also result in additional phosphorus loading to the Lake Mendota system.

**(b)** White Gold dairy did not really consider other locations. The dairy already has a significant investment in the existing site including freestall barns, milking parlor, feed storage, and manure transfer and manure storage. Moving locations on land they owned would not change the potential impacts to the environment.

If the proposed project was enlarged or doubled, the owners would need to work with neighboring land owners to include their property in the NMP for manure land application and additional housing and manure storage would be needed.

Upgrading facilities as proposed will meet the needs of the facility and the goals of the dairy. By upgrading facilities this will allow the dairy to better utilize its manure, minimizing costs and environmental impacts as well as meet WPDES permit requirements.

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#### **SUMMARY OF ISSUE IDENTIFICATION ACTIVITIES**

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26. List agencies, citizen groups and individuals contacted regarding the project (include DNR personnel and title) and summarize public contacts,

completed or proposed).

<u>Date</u>	<u>Contact</u>	<u>Comment Summary</u>
2/15/10	Town of Vienna	Provided general information regarding the digester project at the Town of Vienna Board Meeting. Questions were raised by the citizens regarding noise, truck traffic, and odors, which were addressed during the meeting.
3/8/10	Town of Vienna	Provided general information regarding the digester project at the Town of Vienna Board Meeting. Questions were raised by the citizens regarding noise, truck traffic, and odors, which were addressed during the meeting.
3/22/10	Town of Vienna	Public hearing for the Town of Vienna re-zoning and conditional use permit. There were questions from the neighbors about the project that were addressed during the meeting. Members of the Town of Vienna planning commission went to the Crave Farm to see the digester and talked with the neighbors surrounding the site. They found no complaints from the neighbors and a positive reception of the digester installation. The Planning Commission unanimously approved the rezoning and conditional use permit followed by approval of the Town Board.
Various	Dane County	Numerous meetings which included Kathleen Falk, Dave Merritt, Charles Hicklin, Kevin Connors, John Welch and others to discuss the project and how to move it forward.
Various	DNR	Ken Johnson, Susan Josheff, Mark Cain, Robert Liska, Russ Anderson and Thomas Roushar to discuss completion of the Environmental Assessment, WPDES permit application, storm water permit application, and air permit application
2/3/10	DOA	Peter Maternowski to discuss the qualifications for the use of the funds allocated by the State for the development of this project.
4/12/10	DOC	Tom Garvey and Monte Ewing to discuss the electrical permit for this project and verify classified areas
3/18/10	Village of Waunakee	Provide CSM for ETZ review and approval
4/10	Maiers, DNR, Owners	Two permittee meetings (4/6, 20/10)
4/10	Clear Horizons, Nu Solutions	Several meetings to discuss permits for the Digester and White Gold Dairy (4/5, 15/10)
4/29/10	Dane Co., DNR, Owners	Permittee meeting with owners and Dane Co.

DECISION (This decision is not final until certified by the appropriate authority)

In accordance with s. 1.11, Stats., and Ch. NR 150, Adm. Code, the Department is authorized and required to determine whether it has complied with s.1.11, Stats., and Ch. NR 150, Wis. Adm. Code.

Complete either A or B below:

A. EIS Process Not Required

The attached analysis of the expected impacts of this proposal is of sufficient scope and detail to conclude that this is not a major action which would significantly affect the quality of the human environment. In my opinion, therefore, an environmental impact statement is not required prior to final action by the Department.

B. Major Action Requiring the Full EIS Process

The proposal is of such magnitude and complexity with such considerable and important impacts on the quality of the human environment that it constitutes a major action significantly affecting the quality of the human environment.

Signature of Evaluator	Date Signed
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Number of responses to news release or other notice:

Certified to be in compliance with WEPA	
Environmental Analysis and Liaison Program Staff	Date Signed

NOTICE OF APPEAL RIGHTS

If you believe you have a right to challenge this decision made by the Department, you should know that Wisconsin statutes, administrative codes and case law establish time periods and requirements for reviewing Department decisions.

To seek judicial review of the Department's decision, ss. 227.52 and 227.53, Stats., establish criteria for filing a petition for judicial review. Such a petition shall be filed with the appropriate circuit court and shall be served on the Department. The petition shall name the Department of Natural Resources as the respondent.