CALIFORNIA ENERGY COMMISSION

California Energy Commission

Clean Transportation Program

FINAL PROJECT REPORT

PIXLEY BIOGAS ANAEROBIC DIGESTER

Prepared for: California Energy Commission

Prepared by: Maas Energy Works

Gavin Newsom, Governor

December 2020 | CEC-600-2020-054

California Energy Commission

Maas Energy Works Inc.
Primary Author

Maas Energy Works, Inc.
975 Sierra Vista Dr.
Redding, CA 96003

Agreement Number: ARV-10-053

Akasha Kaur Khalsa
Commission Agreement Manager

Elizabeth John
Office Manager
ADVANCED FUELS AND VEHICLE TECHNOLOGIES OFFICE

John P. Butler II
Acting Deputy Director
FUELS AND TRANSPORTATION

Drew Bohan
Executive Director

ACKNOWLEDGEMENTS

The exceptionally long development timeline of this project meant that several different California Energy Commission project managers and other staff were involved. We are sincerely grateful for their perseverance and support, including:

Rhetta DeMesa

Renee Webster-Hawkins

Sarah Williams

Jim McKinney

Akasha Kaur Khalsa

This project was a one-of-a-kind design that only a very adventurous engineer would take on. We are thankful to ours, Craig Hartman of 4Creeks, Inc.

PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program, formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). The statute authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to $20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about $100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued PON-09-003 to provide funding opportunities under the ARFVT Program for design, construction, and operation of biomethane facilities. In response to PON-09-003, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards on April 7, 2010 and the agreement was executed as ARV-10-053 on March 21, 2014. The grant closeout date was March 31, 2015.

ABSTRACT

Pixley Biogas built an aerobic digester facility to process dairy manure and food waste to create biogas for the Calgren Renewable Fuels ethanol refinery in Pixley, California. The project met its primary goal of providing biogas to offset natural gas consumption at the ethanol refinery, thus reducing the carbon intensity of the ethanol produced. The project creates additional greenhouse gas reductions due to improved manure management.

The high score of the project application made it eligible for partial funding from the California Energy Commission April 7, 2010 under grant ARV-10-053. Construction was delayed due to California Environmental Quality Act concerns raised by private parties, which were eventually satisfied. By the beginning of 2015 the facility was operating continuously and producing biogas at 131,403 standard cubic feet per day, approximately 26 percent of production capacity.

The Pixley Biogas anaerobic digester project has an exceptionally high Assembly Bill 8 Benefit-Cost Score of 1,449 grams of carbon dioxide equivalents for 6 months/grant dollar. It demonstrated other co-benefits such as diverting food processing wastes from the waste stream to fuel and agricultural use and use of lower temp8erature "waste heat" from the refinery's combined heat and power plant to supply process heat for the digester. Including the California Energy Commission grant funding, the project will achieve simple payback in 9.72 years.

The biogas facility constructed consists of a manure collection and transport system, a 1,400,000-gallon anaerobic digester vessel, a biogas utilization system, and a post-digester manure separation system.

Milestones achieved in the demonstration period from September 1 to February 28, 2015 are:

- Reduced greenhouse gas emissions by an estimated 6,466 metric tons of carbon dioxide equivalent through avoided emissions from the participating farm's manure storage.
- Reduced natural gas consumption at the Calgren facility by an estimated 7,387 million British Thermal Units, thereby reducing greenhouse gas emissions by 392 metric tons of carbon dioxide equivalent.
- Created a total estimated employment effect of 121.8 direct and indirect jobs.

TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

EXECUTIVE SUMMARY

The Pixley Biogas Anaerobic Digester Project built an aerobic digester facility designed to process dairy manure and food waste to create biogas adjacent to the 55,000,000 gallon per year Calgren Renewable Fuels ethanol refinery in Pixley, California. The project met the single goal, to provide the new digester's biogas to offset natural gas consumption at the ethanol refinery, thus reducing the carbon intensity of the ethanol produced. The project creates additional greenhouse gas reductions due to improved manure management.

The high score of the project application made it eligible for partial funding from the California Energy Commission April 7, 2010, but the grant ARV-10-053 was significantly delayed due to the California Environmental Quality Act concerns raised by private parties. A California Environmental Quality Act Environmental Impact Report ultimately satisfied Tulare County with changes in the project design, scope, and location. The term of the Clean Transportation Program grant funding was March 21, 2014 to March 31, 2015, a very compressed timeline. The project was built between February 2014 and September 2014, substantially on time and on budget in full compliance with all regulatory requirements (Figure 1). In the beginning of 2015, the facility was processing manure and food waste continuously and producing 131,403 standard cubic feet per day biogas, approximately 26 percent of production capacity. Biogas production is expected to grow as a greater volume of non-manure organic wastes are added.

Figure 1: Completed Pixley Anaerobic Digester Project

Source: Ryan Krauter, 4Creeks Creative

The project successfully demonstrated the effectiveness of using agricultural feedstocks to create fuel in an industrial application. It also demonstrated other co-benefits such as diverting food processing wastes from the waste stream to fuel and agricultural use and use of lower temperature "waste heat" from the refinery's pre-existing combined heat and power plant to supply process heat for the digester. Including the benefit of California Energy Commission grant funding, the project will achieve simple payback in 9.72 years. This is a modest return on investment in financial terms, but a large benefit in Calgren Renewable Fuels' ability to continue to produce the lowest carbon intensity ethanol in California. This project would not have been done without the state grant.

CHAPTER 1: Background

Problem Statement

Anaerobic digesters offer tremendous potential for renewable energy generation, greenhouse gas reduction, and protection of air and water quality. However, the market, environmental, and technical barriers present in the San Joaquin Valley and elsewhere in the state have prevented widespread adoption of digester technology. Air and water regulations have drastically slowed farmers' implementation of digester projects in the San Joaquin Valley and reduced the potential gains for those who do. The market for digester biogas has been slow to emerge since farms cannot normally use the biogas that digesters generate without investing in additional expensive infrastructure.

The statute-specified Clean Transportation Program goal that Pixley Biogas Anaerobic Digester project addresses is primarily to decrease, on a full-fuel-cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability. The largest alternative fuel gasoline replacement in California and the United State is ethanol. The Pixley Biogas Anaerobic Digester project is well positioned to make such an impact on the largest component of alternative gasoline fuels.

Calgren Ethanol Refinery

Ethanol Output

The Pixley Biogas project fits into the overall operations of the nearby Calgren Renewable Fuels ethanol facility. That facility processes corn, and sometimes sorghum, into ethanol for sale into the California vehicles fuels market. Most of the fuel serves the greater Fresno area and is distributed by Flyers Energy. The plant's capacity is 55,000,000 gallons per year of E100 ethanol. In an E10 blend it serves half a billion gallons of fuel.

Fuel Cycle

The Calgren facility is a dry mill, wet distiller's grain refinery.

Existing Combined Heat and Power System

The Calgren Renewable Fuels ethanol refinery supplies all of its own heat and power using a pipeline natural gas-fired cogeneration turbine with approximately 5 MW electrical capacity. The combined heat and power system, owned by Calgren's affiliate Pixley Cogen Partners LLC, is located just south of the ethanol plant and just east of the Pixley Biogas Anaerobic Digester site (Figure 1). That turbine creates electricity for the refinery, and fuel is injected via a "Duct Burner" into the exhaust stream to create additional steam for the refinery. The biogas from the Pixley Biogas Anaerobic Digester offsets some of the natural gas consumption of the combined heat and power system's duct burner. The biogas is not making electricity. To accommodate increased electrical loads from new tenants at the refinery, a second Pixley Cogen Partners turbine was added during the construction of the Pixley Biogas Anaerobic Digester project.

Ethanol Carbon Intensity Baseline

The California Low Carbon Fuel Standard default carbon intensity for California Dry Mill, Wet Distiller's grain solids, powered by natural gas is 80.70 grams of carbon dioxide equivalent per megajoule (gCO_2e / MJ) (pathway ETHC003).[1] This pathway takes into accounted indirect land use changes caused by corn cultivation, which may possibly be reduced in the future. Calgren has submitted a Method 2A/2B application for a custom pathway that takes into account the efficiencies of cogenerating heat and power, the beneficial use of wet distiller's grain coproducts, and other efficiencies unique to the plant. The proposed new pathway's carbon intensity is 68.22 gCO_2e /MJ when operating on 100 percent pipeline natural gas. Even before the introduction of the digester biogas, Calgren produced the lowest carbon intensity ethanol in California.

Four J Farms

The livestock manure feedstock for the Pixley Biogas Anaerobic Digester is supplied by the dairy Four J Farms, located approximately 1 mile south of the digester. Four J Farms hosts 1,800 Jersey milk cows, plus over 2,000 dry cows, heifers, and young stock. All milk cows at the facility are housed in two large free stall barns. The dry cows and heifers are housed in dry, open lots with feeding lanes. Four J Farms plans to increase the number of milk cows by 700 before 2018 now that the new 37 million gallon, fully lined, open lagoon built by the project can handle the effluent.

Manure Management

The dairy uses flush manure management to collect manure from both the free stall barns and the dry lots. Prior to the project, all free stall and dry lot manure entered one earthen manure pond system via gravity. Now manure is pumped from the low point down the pipeline to the digester vessel. The dairy cows are bedded on fresh and/or recycled sand. The dry lots use composted manure for bedding.

Dairy Carbon Intensity

The carbon intensity of dairies is not routinely measured by existing permits or other methods. However, modeling consistent with the California Air Resources Board Livestock Protocol determines that the first-year baseline greenhouse gas emissions due to manure produced by the 1,800 milk cows (3,800 head of stock) at Four J Farms are approximately 12,860 metric tons of carbon dioxide equivalent (CO_2e) per year. According to calculations supplied in Appendix E the project will create a net reduction of over 90 percent of the baseline greenhouse gas reduction at Four J Farms. One cow supplies enough manure for approximately 36,500 standard cubic feet of biogas per year from the anaerobic digester—while also enabling additional biogas production from co-digestion of food waste

Historic California Anaerobic Digester Systems

California has seen a variety of on-farm anaerobic digestion technologies. There are three major types. Complete mix digesters are insulated, round steel or concrete tanks that have mechanical mixers and internal or external heaters. Covered lagoon digesters are earthen

[1] Low Carbon Fuel Standard, Final Regulation Order Title 17, California Code of Regulations, sections 95480-95490. "Table 6. Carbon Intensity Lookup Table for Gasoline and Fuels that Substitute for Gasoline." (http://www.arb.ca.gov/fuels/lcfs/010611lcfs_lutables.pdf) 3/31/15

manure ponds with flexible biogas collection covers. They usually lack heaters or have limited external heating. Mixed plug flow digesters are insulated concrete vessels with internal heaters and internal biogas mixing. All three digester types are typically paired with internal combustion engines or other systems for converting biogas to electricity. The Pixley Biogas anaerobic digester is the mixed plug flow type. However, it is not making electricity; it is making process steam for transportation fuel manufacture.

Natural and Regulatory Climate for Anaerobic Digesters

The California climate is generally conducive to anaerobic digestion, with many large farms, warm temperatures, and few natural obstacles to construction other than seismic risks. The primary obstacle is the high cost of construction generally and the regulatory environment for water and air emissions specifically. These require digesters to meet fairly stringent construction standards, operations standards, and to secure multiple approvals prior to construction startup.

Digester Public Funding History

Anaerobic digesters in California have received public funding for the past 10-15 years. In some cases, older anaerobic digestion systems have been shut down. There are several primary causes for these failures. First, early systems were individually implemented in an immature industry where early digester designs were not proven, and few companies existed that could support long-term digester operations. These custom projects gradually became too problematic to operate and the owners ceased maintaining them.

Second, the engines used to convert digester biogas into electricity were not able to meet the latest air quality standards. If the owner was not willing to upgrade the engine or install emissions controls, these projects also shut down over time.

Third, the utility companies did not have a favorable power feed-in tariff for renewable energy generation. Consequently, the maintenance costs of the digesters frequently exceeded the expected revenue from future operations. Under Senate Bill 1122 current California Public Utilities Commission rulings are working to establish a new feed-in tariff that will incentivize more digester projects. The Pixley Biogas Anaerobic Digester Project biomethane is not making electricity; it is making process steam for transportation fuel manufacture. The income structure is simpler and more dependable.

Fourth, regulations in most dairy regions of the state require that new digesters must isolate liquid effluent in double-lined ponds to protect the ground water. This greatly increases capital costs.

Projects built in the past 3-5 years have so far had more success in sustaining operations due to the presence of more proven designs, experienced contractors, and lean-burn engines with emissions catalysts capable of meeting current air quality standards. Water board requirements on ponds are still a major obstacle to new digester construction.

CHAPTER 2:
Project Conception & Design

Goal

The goal of the Pixley Biogas Anaerobic Digester Project, to reduce the full fuel cycle carbon footprint and increase the sustainability of ethanol produced by Calgren Renewable Fuels' refinery by producing biogas generated from local dairy manure, was met.

Objectives of Agreement

The objectives of this Pixley Biogas Anaerobic Digester Project were to construct a biogas facility, consisting of a Manure Collection and Transport System, an Anaerobic Digester, a Biogas Utilization System, and a Post-Digester Separation System, to produce biogas, to reduce natural gas consumption, to reduce methane emissions from manure storage, and to prove the viability of farm anaerobic digestion in the San Joaquin Valley. All these objectives were met. The quantitative objectives were:

Produce up to 8,000 million British thermal units per month of biogas via anaerobic digestion using manure feedstock from nearby dairies.

Reduce natural gas consumption on the Calgren Renewable Fuels biorefinery by up to 12,000 million British thermal units per month as adjusted for plant output

Create up to 20,000 tons of carbon dioxide reductions through avoided emissions from participating farms' manure storage and reduced natural gas consumption at the Calgren facility.

The initial project conception involved several dairies that would supply manure to the digester. Neighborhood insistence on reducing perceived air quality and other impacts had significant impact on manure delivery design. Due to California Environmental Quality Act and other permitting requirements, the project design was modified, in consultation with the California Energy Commission, from trucking in to piping in the manure. The site is practically odor-free during regular operation because there is no open manure on site. The final project design incorporated manure feedstock from only one dairy farm. This change reduced the attainable output of biogas and carbon dioxide reductions by at least one third. Other feedstock supplies will be acquired in the future.

Project Design

Concept of Operations

The Pixley Biogas Anaerobic Digester Project facility operates seven general processes, located at two sites that are connected by pipeline. Each of these processes is described in the following paragraphs. In Section 2, Project Components, the individual pieces of equipment and controls are discussed in more detail.

Manure Thickening and Transport to Digester

The Four J Farms dairy facility currently milks approximately 1,800 Jersey cows. The manure from these animals is flushed from the barns twice per day, from 4:00 AM to 6:40 AM, and again from 4:00 PM to 6:40 PM. Additional flushes can be manually controlled by the

personnel operating the milk parlor. The manure from the barns drains to an Octagon Flush Pit at the south end of the farm (Figure 2), and then is recirculated back through the barns to collect the manure excreted by the cows therein.

Figure 2: Manure Thickening and Transport to Digester

Source: Maas Energy Works, Inc.

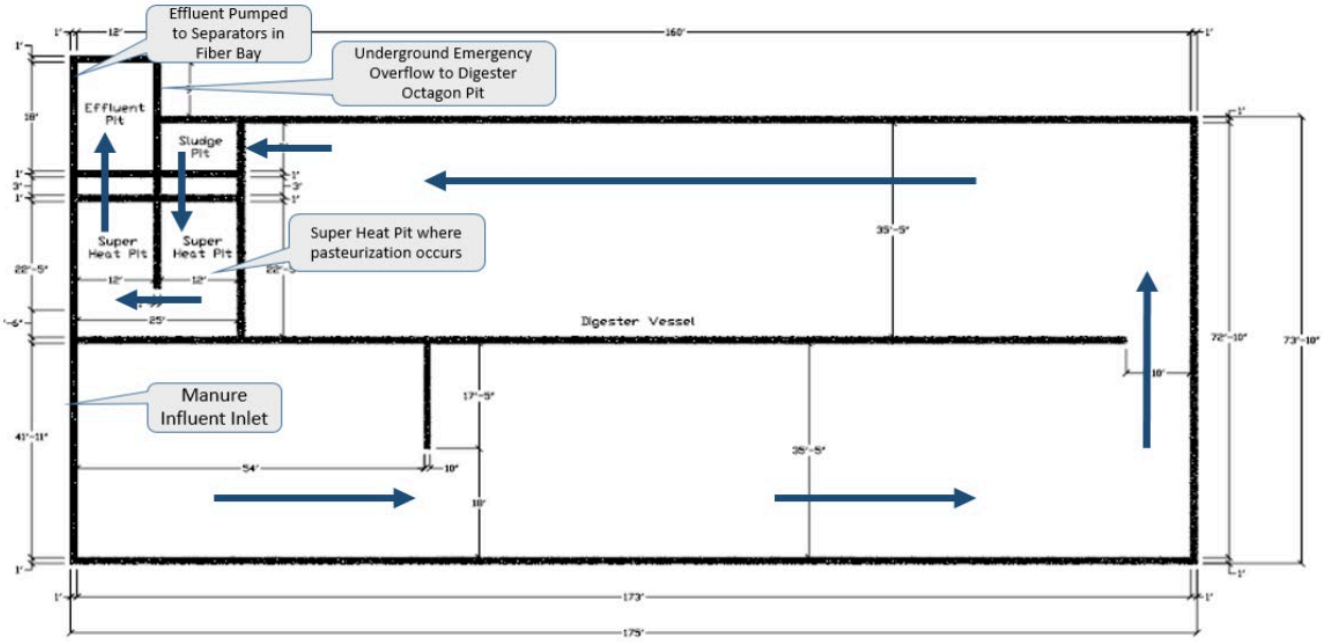
The thickest manure is pumped out of the Octagon Process Pit, filtered into the adjacent Rectangle Influent Pit, and from there a slurry of controlled thickness is pumped up the pipeline to the Digester Vessel near the Calgren refinery. An estimated 60,000 gallons of manure is pumped to the digester per day. The manure flow to the digester is uneven, with large bulges occurring after each flush cycle (two per day) at the dairy. The volume of manure sent from the farm to the digester is controlled by manipulating manual valves in the thickening system, as discussed in the "Project Components" section of this document.

Manure Digestion and Pasteurization

The manure from Four J Farm's thickening system flows through the pipeline northward until it enters the low-silhouette 1.4-million-gallon concrete digester vessel located at the Digester Site, the second of the project's two sites. Once inside the digester, the manure in the digester is heated by hot water filled pipes inside the vessel. The main chamber of the digester is heated to 100F, while the final "super-heat" section pasteurizes the manure at approximately 140F for another 12-24 hours. The manure flows through the digester's zones over approximately three weeks, with newly arriving manure displacing old manure forward, such that the first gallon into the digester is (roughly) the first gallon out. This hydraulic retention time of approximately 17 days is key to biogas production and pathogen reduction.

The feedstock enters the digester vessel at the lower left of Figure 3. Solid, liquid and gas products leave the digester from the upper left. In this view from above the mechanical building is "above" (East) of the orientation of this drawing

Figure 3: Manure Digestion and Pasteurization



The intention is to convey the major components

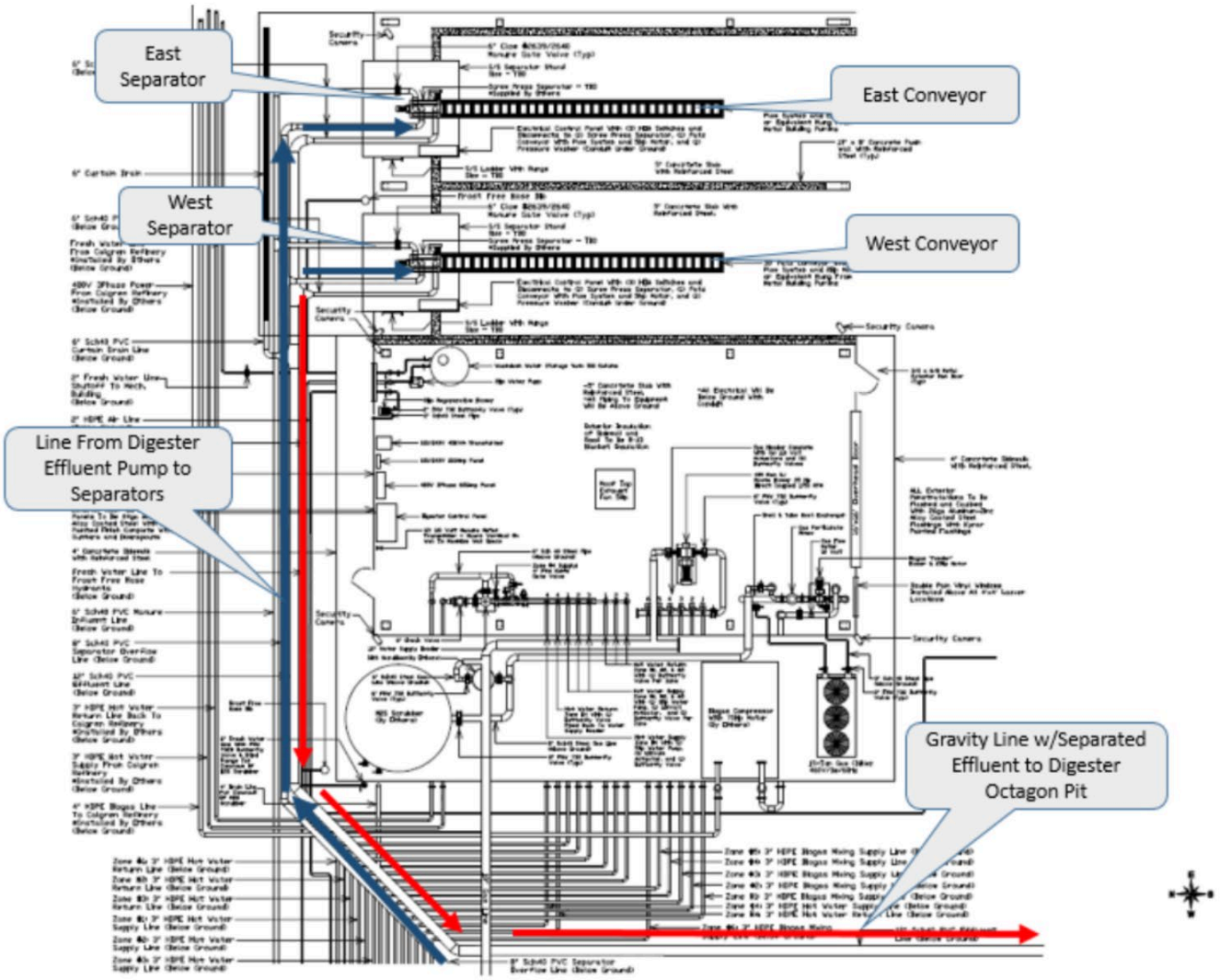
Source: Maas Energy Works, Inc.

Manure Separation and Return to Four J Farms

Figure 4 shows the Mechanical Building in the lower half and the two Fiber Bays in the upper half. The digester is "below" this drawing, which is a view from above. The digested manure is pumped out of the Digester Vessel and sent via underground pipes to the two Screw Press Separators located high in the Fiber Bays attached to the Mechanical Building. This transfer out of the digester is gradual.

Usually one Screw Press Separator runs most of the day to fill one open truck (Figure 4).

Figure 4: Manure Separation and Return to Four J Farms



The intention is to convey the major components

Source: Maas Energy Works, Inc.

Fiber Handling and Transport

Two Screw Press Separators in the upper North portion of the Fiber Bays discharge the separated manure fiber solids onto conveyors in the Fiber Bays, which, each in turn, loads a truck parked in bay (or stacks the fiber on the floor if no truck is present) as shown in Figure 5. Each separator/conveyor has an on/off switch at the south end of the bays' dividing wall. Personnel from Four J Farms are responsible to drive and unload the fiber trucks at the Four J Farms dairy, for use as animal bedding.

Figure 5: Fiber Handling and Transport

Source: Maas Energy Works, Inc.

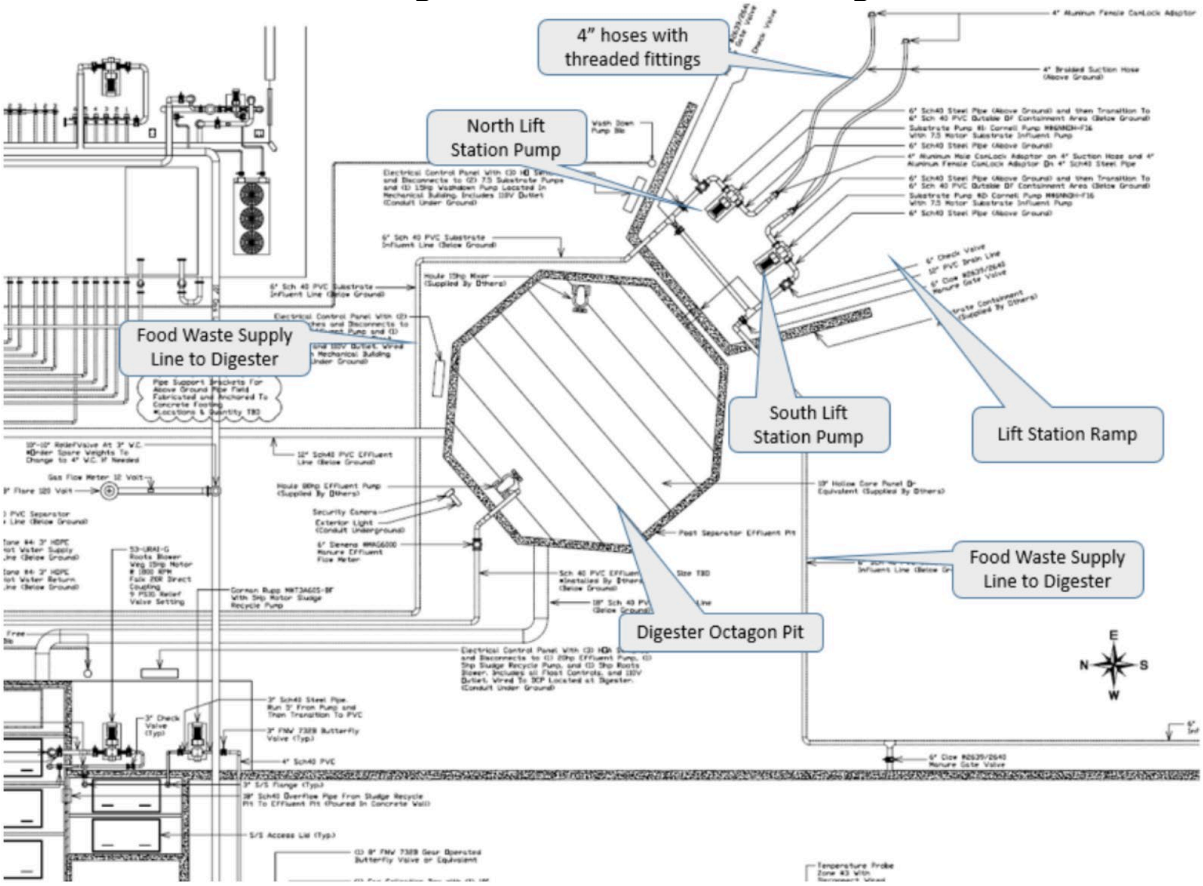
The Separators discharge their liquid via underground gravity pipe to the Digester Octagon Pit (Figure 6). As the octagon pit fills up, the two Manure Return Pumps (one primary, one secondary) in the Dry Well adjacent to the Digester Octagon Pit send this liquid back down the pipeline to the new lined pond at Four J Farms.

The new 37,000,000-gallon lined pond at Four J Farms handles the majority of Four J Farms' pasteurized wastewater, including all manure from the milking herd, which was previously handled in unlined earthen ponds. The Pixley Biogas Anaerobic Digester effluent accumulates in the pond during the "rainy season" of Nov- March and is spread on the fields during the drier months of the year. This reduces groundwater usage for irrigation, while also offsetting the need to import commercial fertilizer.

Substrate Offloading

In addition to the manure from Four J Farms, the facility also receives trucked liquid food waste from a variety of customers. These trucks unload at the Lift Station ramp adjacent to the Digester Octagon Pit by connecting to hose fittings that empty into a tank located on that ramp as shown in the upper right of Figure 5. The tank is equipped to pump the food waste into the digester. The truck drivers are responsible to rinse down in the Lift Station ramp area. Spills on that ramp drain into the Digester Octagon Pit to be pumped a mile to the new lined pond at Four J Farms as seen in Figure 6. Just the East edge of the digester shows in the lower portion of this drawing.

Figure 6: Substrate Offloading



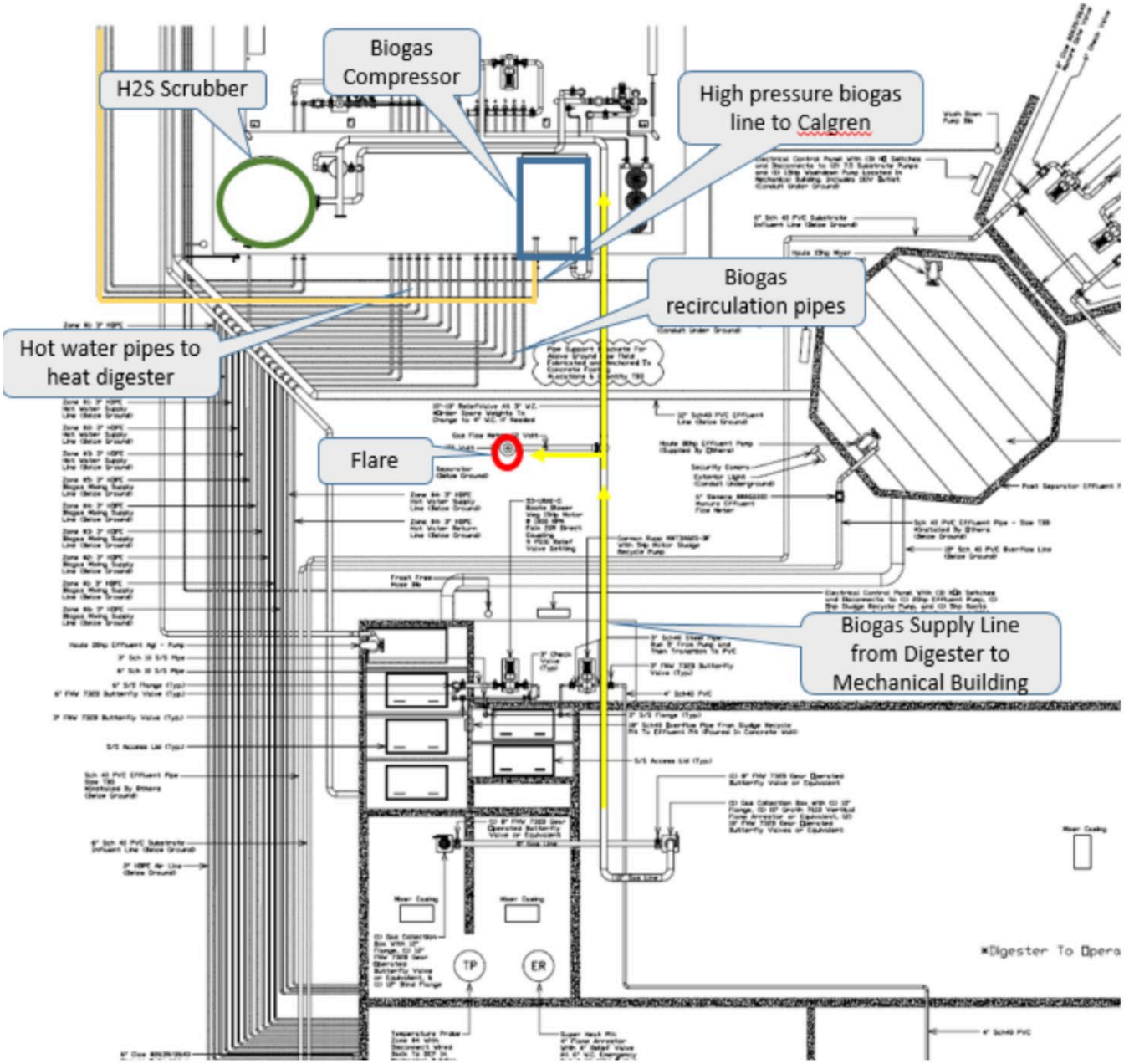
The intention is to convey the major components

Source: Maas Energy Works, Inc.

Biogas Handling and Transport

The project creates biogas in the Digester Vessel. The gas is collected at the top of the digester, to flow at low pressure through the Biogas Scrubber, which removes the sulfur. Then in the Mechanical Building the water vapor is removed. The clean biogas moves eastward underground to the Pixley Cogen Partners cogeneration unit for combustion. If the biogas cannot be transported to the cogeneration unit, then it is automatically burned in the project's on-site flare, indicated with a red circle in Figure 7. The details on the biogas transport components and controls are found in Section 2 of this document.

Figure 7: Biogas Handling and Transport



The intention is to convey the major components

Source: Maas Energy Works, Inc.

Hot Water Handling and Transport

The digester is divided into 4 heating zones and heated by waste hot water supplied by Pixley Cogen Partners. The two systems contain separate heating loops, with an interposing heat exchanger located at the Pixley Cogen Partners facility. Hot water from Calgren, piped into the Mechanical Building, enters the vertical hot water header. When each zone calls for heat, its respective pump turns on and sends heated water into the digester. The water is cooled in the digester, sent back to the header, then back to Calgren to be re-heated.

Other Facility Attributes

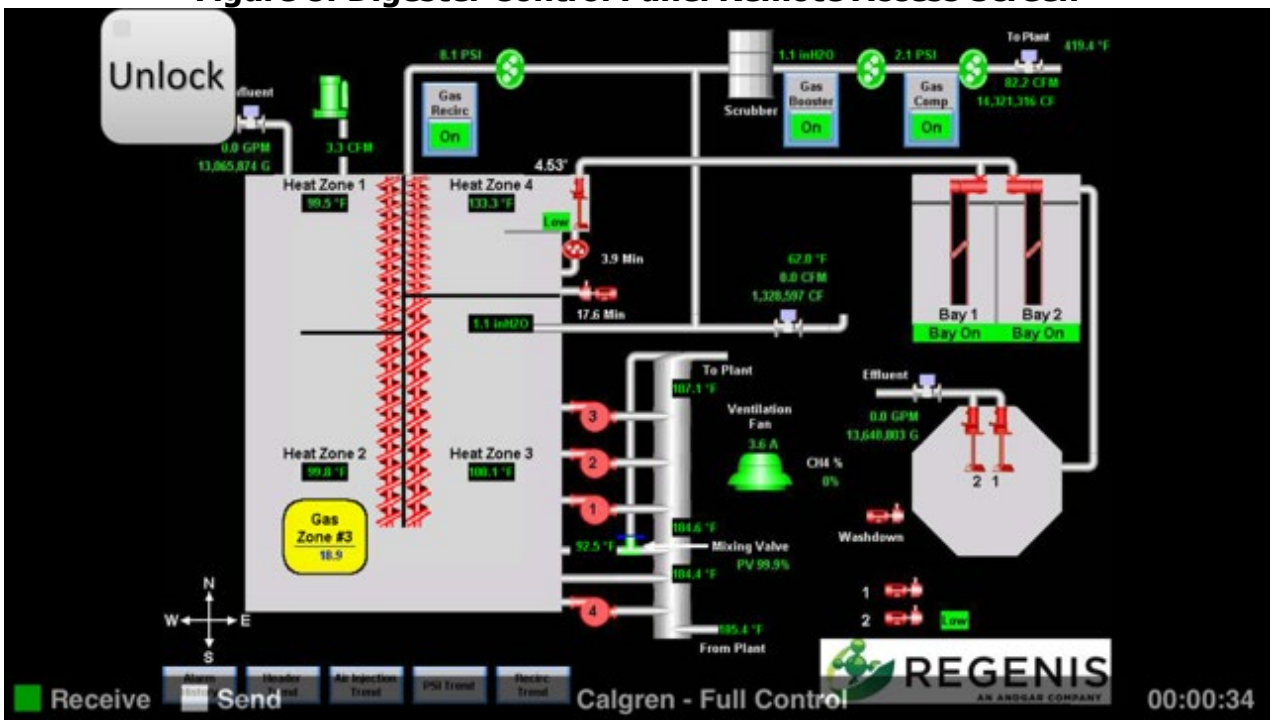
Air Quality Preservation

The original project concept in the grant application involved hauling manure solids from multiple area dairies. The project also included an open-topped receiving pit for unloading food wastes. In the interests of preventing odors and protecting air quality, these elements were eliminated. Now, all manure arrives at the facility via an underground pipeline and enters the digester without any exposure to the air. Furthermore, all trucks unloading food waste discharge their contents directly into a lift station system, with no exposure to the air. The improvements increased project cost and complexity but removed nearly all risks of escaping raw manure or food waste odors.

Facility Monitoring

The Calgren ethanol refinery has a constantly maintained control room for 24-7 operation. The Pixley Biogas Anaerobic Digester facility's control panel is connected to the Calgren control to provide continuous monitoring. The equipment that can be seen are the influent and effluent pumps, compressor with biogas pressure and flow rate, heating zone temperatures, heating valve states, lift station in-use status, biogas and manure flow totals, and others. (Figure 8). On/off switches include the gas recirculation inside the digester (to stir the slurry), the gas booster pump, the biogas compressor, solids processing, and others. The connection to the Calgren control room is via hard line. The facility can also be monitored and controlled with password access from any internet device.

Figure 8: Digester Control Panel Remote Access Screen



Source: Pixley Biogas, LLC

Heat Recovery Steam Generator

The Pixley Biogas project does not deploy its own Combined Heat and Power / Cogeneration Equipment in isolation. Rather, the project makes use of existing cogeneration equipment at the adjacent Pixley Cogen Partners facility. Pixley Cogen Partners uses a natural gas fueled

combined heat and power turbine to produce both electricity and heat, as described below. The digester project supplies fuel to offset fossil fuel consumption by the combined heat and power system. The digester also makes use of waste heat from the cogeneration process, to provide digester heating. As such, the project is part of an integrated cogeneration system.

Pixley Cogen Partners have a Heat Recovery Steam Generator, an existing device attached to the electrical power generation turbine that converts the exhaust heat into very hot steam. This steam is used for process heating at the Calgren ethanol refinery. The existing turbine is a very advanced combined heat and power/cogeneration system. The biogas replaces natural gas injected into the Heat Recovery Steam Generator's duct burner. The carbon dioxide by-product from the anaerobic digester is released here during the combustion that converts the biogas into heat and the water to steam.

Maintenance Requirements

The facility is maintained by existing personnel at the Calgren ethanol refinery. Maintenance requirements include daily checks of equipment, recording data, greasing and maintaining machinery, and troubleshooting error codes or irregularities. Total average maintenance requirements are less than 8 hours per day, although some periodic maintenance is more extensive.

Breakdown Contingency Plans

If for any reason the digester is unable the process manure, the thickening system automatically shuts off the flow of manure to the digester. The dairy can continue to operate its manure handling system indefinitely without pumping manure the digester. The Pixley Biogas digester can operate without receiving any manure influent, but it will gradually produce less and less biogas, approaching zero biogas production in approximately three weeks. The Pixley Cogen Partners cogeneration turbine is able to function on 100 percent pipeline natural gas whenever the flow from the digester is unavailable. A breakdown does not halt operations at the feedstock supplier nor the biogas consumer.

Chapter 3:
Project Implementation

Implementation Plan

The project was constructed using proven engineers and contractors with experience in anaerobic digester construction. Overall the project was owned by Pixley Biogas LLC, whose president was Lyle Schlyer, also the president of GFP Ethanol LLC, owner of Calgren Renewable Fuels. Various Calgren staff participated in a variety of project implementation, startup, and operations roles.

Contractor List

Pixley Biogas LLC hired Daryl Maas of Maas Energy Works (Redding, California) as the project's overall project manager, reporting to Lyle Schlyer. Daryl was responsible for conceptual design, project team coordination, permit compliance, scheduling, reporting and other project management tasks.

Other project team members are listed below (not all received California Energy Commission Funds):

Frank Junio and the whole Junio family of Four J Farms (Pixley, California) are the owner/operators of the dairy, the new 37 million gallon, fully lined, open dairy lagoon and the associated cropland.

Craig Hartmann of 4Creeks, Inc. (Visalia, California) served as project engineer.

Stephen Dvorak of DVO, Inc. (Chilton, Wisconsin) served as design engineer for the digester system.

Mike Apol of Regenis-an Andgar Company (Ferndale, Washington) served as supervisor for digester construction.

Kevin Fees of Fee's Trucking (Pixley, California) served as excavator and underground installer, except for the main pipeline between the Pixley Biogas digester and Four J Farms dairy farm.

Brough Construction (Arroyo Grande, California) installed the main pipeline between the Pixley Biogas digester and Four J Farms.

Environmental Fabrics, Inc. (Gaston, South Carolina) served as the pond liner installer at Four J Farms.

Permits Required

Construction and operation of the facility required the permits listed in Table 1, which are also listed in the appendices.

Table 1: Permits Required

Agency	Permit	Notes
Tulare County	Solid Waste Permit with CalRecycle Endorsement	Necessary to introduce non-manure wastes into the digester
San Joaquin Valley Air Pollution Control District	Authority to Construct	For flare emissions
Tulare County	Conditional Use Permit	For land use authorization
Tulare County	California Environmental Quality Act Environmental Impact Report	Originally the Tulare County staff found that a Mitigated Negative Declaration would be sufficient, but private opposition triggered the Environmental Impact Report.
Central Valley Regional Water Quality Control Board	Pond Acceptance	This approval of lined pond and digester vessel also required Four J Farms documents including well monitoring plan, and salt minimization plan.
Tulare County	Building Permit	
Tulare County	Encroachment Permit	Includes county right of way access for pipeline from Pixley Biogas to Four J Farms

Source: Pixley Biogas, LLC

Project Schedule

The project schedule was unintentionally dictated by the California Environmental Quality Act approval schedule, since the Environmental Impact Report and County Conditional Use Permit were delayed multiple times from 2011 to 2014. Once the project received final California Environmental Quality Act approval in February of 2014, the project needed to begin processing manure by the end of September 2014 in order to meet California Energy

Commission Clean Transportation Program financial timelines. Consequently, the construction needed to occur within seven months. Table 2 provides actual dates of deliverables.

Table 2: Schedule of Deliverable California Energy Commission Products

Task Number	Task Name	Product(s)	Due Date	Submitted
1.1	Attend Kick-off Meeting			
		Updated Schedule of Products	2 days prior to the kickoff	4/4/2012
		Updated List of Match Funds	2 days prior to the kickoff	4/4/2012
		Updated List of Permits	2 days prior to the kickoff	4/4/2012
		Kick-Off Meeting Agenda (California Energy Commission)	Commission	
1.2	Critical Project Review Meetings			
	1st CPR Meeting	CPR Report	11/17/2014	11/17/2014
		Agenda and a list of expected participants (CEC)	Commission	
		Schedule for written determination (CEC)	Commission	
		Written determination (CEC)	Commission	
1.3	Final Meeting			
		Written documentation of meeting agreements	2/17/2015	2/17/2015
		Schedule for completing closeout activities	2/17/2015	2/17/2015
1.4	Monthly Progress Reports			
		Monthly Progress Reports	The 10th of each month during the approved term of this Agreement	Completed 1/29/15
1.5	Final Report			
		Draft Outline of the Final Report	1/15/2015	1/13/2015
		Final Outline of the Final Report	2/2/2015	2/4/2015

Task Number	Task Name	Product(s)	Due Date	Submitted
		Draft Final Report	2/16/2015	pending
		Final Report	3/2/2015	pending
1.6	Identify and Obtain Match Funds			
		A letter regarding match funds or stating that no match funds are provided	2 days prior to the kickoff	4/29/2014
		Copy(ies) of each match fund commitment letter(s) (if applicable)	2 days prior to the kickoff	4/29/2014
		Letter(s) for new match funds (if applicable)	Within 10 days of identifying new match funds	n/a
		Letter that match funds were reduced (if applicable)	Within 10 days of identifying reduced match funds	n/a
1.7	Identify and Obtain Required Permits			
		Letter documenting the permits or stating that no permits are required	2 days prior to the kickoff	4/30/2014
		A copy of each approved permit (if applicable)	Within 10 days of receiving each permit	10/31/2014
		Updated list of permits as they change during the term of the Agreement (if applicable)	Within 10 days of change in list of permits	N/A
		Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable)	Within 10 days of change in schedule for obtaining permits	N/A
1.8	Obtain and Execute Subcontracts			

Task Number	Task Name	Product(s)	Due Date	Submitted
		Letter describing the subcontractors needed, or stating that no subcontractors are required	2 days prior to the kickoff	6/18/2014
		Draft Subcontracts	15 days before the scheduled date of execution	6/18/2014
		Final Subcontracts	Within 10 days of execution	6/18/2014
2	Pre-Construction			
		Construction and Equipment List	3/13/2014	3/13/2014
		Letter of Verification of Design Work	3/11/2014	3/11/2014
		Construction Timeline	3/11/2014	3/11/2014
3	Construction			
		Written Notification of Readiness to Construct	3/11/2014	3/11/2014
		Written Notice of Commercial Operation	9/5/2014	10/16/2014
4	Operations			
		Operations Report	1/15/2015 1/28/2015	1/30/2015
5	Data Collection and Analysis			
	None. Information will be included in Final Report		NA	

Source: Pixley Biogas, LLC

Project performance in meeting actual deadlines versus schedules deadlines is shown in the table above. The initial proposed construction budget was $8,827,308. Actual budget numbers are shown below.

Actual Construction Budget

Figure 9 below shows total construction budget, including California Energy Commission and Match funds. The $4,672,798 grant was 42.96 percent of total project costs. There are three potential areas of savings that future projects could pursue.

First, the one-mile pipeline between the digester site and the dairy farm site required a major pipeline installation. Additionally, this pipeline needed to be installed in the county right of way since a private property easement could not be secured for the full distance between the two sites. Construction in the public right of way required very high standards of design, raising the total pipeline cost to over $1,000,000.

The second additional cost incurred by the project was the new, double-line pond at Four J Farms. This pond also cost nearly $1,000,000 to install. The pond was not part of the digester system but was required by the Regional Water Board since the digester would be processing and discharging non-manure wastes such as food wastes.

Finally, the project incurred over $500,000 in additional costs due to a relocation of the digester site. Neighbors' opposition to the project during the California Environmental Quality Act process forced Pixley Biogas to relocate the digester site to an existing water retention pond south of the Calgren ethanol facility (the as-built site today). This water pond had to be drained, excavated to native dry soil, and then filled with compacted material.

Figure 9: Total Project Construction Expenses

ENERGY COMMISSION SHARE Line Item	Budgets
Personnel	0.00
Fringe Benefits	0.00
Travel	0.00
Equipment	242,500.00
Supplies	11,300.00
Contractual	4,418,998.00
Construction	0.00
Other	0.00
Indirect	0.00
TOTALS	4,672,798.00

MATCH SHARE Line Item	Budgets
Personnel	0.00
Fringe Benefits	0.00
Travel	0.00
Equipment	270,108.00
Supplies	124,807.00
Contractual	5,710,604.00
Construction	0.00
Other	97,517.00
Indirect	0.00
TOTALS	6,203,036.00

GRAND TOTALS	10,875,834.00

Source: Pixley Biogas, LLC.

Simple Payback

The $10,875,834 investment of the Pixley Biogas, LLC will be paid back in 19.51 years, without considering interest, based on these assumptions:

10-year average annual income of $735,484 including $341,200 in biogas, $126,785 in Carbon Credits, and $267,499 in Tipping Fees. The project does not create any new Renewable

Information Number since it is merely changing the inputs into an existing, unchanged volume of ethanol production at the Calgren Renewable Fuels facility.

10-year average annual expenses of $178,042 including $23,862 in utilities, $30,645 in direct labor, $40,860 in consultants and testing, and $2,767 in biogas treatment.

10-year average annual Profit (defined as Earnings before Interest, Taxes, Depreciation and Amortization) of $557,442.

3103 Policy Analysis

Our company is not an obligated party under the Low Carbon Fuel Standard, therefore the discount provision in the grant Terms and Conditions, Section 3103 of the California Title 20 Code of Regulations, does not immediately impact us. However, we have been planning to opt into the Low Carbon Fuel Standard at some point in the future. The discount provision makes us hesitate. We have delayed that opt-in and thus delayed the generation of carbon credits thereunder. The current 3103 regulation reduces the generation of Low Carbon Fuel Standard credits, while also having a negative financial impact on our company.

Additionally, some of our affiliated companies have plans to use our project's renewable fuel in the creation of the Low Carbon Fuel Standard credits. The 3103-discount requirement may also apply to these affiliates and if so, then we would be economically hurt while generating Low Carbon Fuel Standard credits for three years following the Agreement term. The Section 3103 regulation is a significant obstacle to our project. We support the elimination of this regulation since it provides no appreciable benefit while preventing or delaying participating in programs designed to encourage participating of renewable fuels providers.

Increased State Revenue

The project will contribute an estimated $108,109 per year in direct increases in state and local taxes, as described below.

Property Tax

The new equipment installed on the digester will increase the real estate and personal property tax basis of the owners. The property tax valuation has not yet been determined but based on $4,000,000 of newly assessed property at the site's current assessed rate of 1.13 percent, the increase in property taxes will be $45,200 per year.

Corporate Income Tax

At a 10-year average Earnings Before Interest, Taxes, Depreciation and Amortization of $557,442 at the current California corporate income tax rate of 8.84 percent, the average annual increase in state income tax is $49,278

Sales and Use Tax

The project's 10-year average annual expenses other than labor are calculated at $147,397. At the site's sales and use tax rate of 8.0 percent, the average annual increase in sales and use tax is $11,792.

Personal Income Tax

The project is estimated to pay direct labor costs averaging $30,645 per year over a 10-year period. At an estimated effective personal income tax rate of 6 percent, the average annual increase in personal income tax is $1,839.

Chapter 4:
Project Operations

Narrative Description

The commissioning period of the digester was from August 24, 2014 to December 31, 2014. Steady state production began January 1, 2015.

Manure Processing: The Pixley Biogas anaerobic digester first began receiving manure on August 24, 2014 and has processed manure continuously and without interruption since startup. Additionally, the manure thickening equipment at Four J Farms has worked continuously since startup. There has been one stoppage of manure deliveries from Four J Farms to the Pixley Biogas digester: Between approximately October 7-9, Operations personnel improperly adjusted the settings on the manure thickening equipment at Four J Farms in such a way as to produce overly thick manure for delivery to the digester. This manure plugged the pipeline between the Four J Farms dairy facility and the Pixley Biogas digester on October 10, 2014. No manure could be delivered to the digester until October 17, 2014. The digester continued operating and producing methane during this manure delivery stoppage. Improved employee training was implemented, and there have been no further stoppages in manure delivery.

Biogas Production: The Pixley Biogas digester first combusted biogas on September 19, 2014 and has generated biogas continuously ever since. A record of biogas production is included later in this report. Although there has been no stoppage of biogas production, there have at times been interruptions of biogas delivery to the Pixley Cogen Partners facility. Nearly all of these interruptions were caused by controls and programming issues with the project's Biogas Compressor. The compressor controls have since been modified to nearly eliminate outages. During periods of Biogas Compressor failure, the digester's biogas was combusted in the onsite flare (Figure 1). A record of this flare usage is included in the up time/down time report later in this report.

Regulatory Compliance

The project is compliant with all regulatory requirements, including its Tulare County Solid Waste Permit, its Tulare County Conditional Use Permit, its San Joaquin Valley Air Pollution Control District Authority to Construct, and all applicable Regional Water Board orders and Waste Discharge Requirements. These are included in the Appendices.

Project Components Illustrations

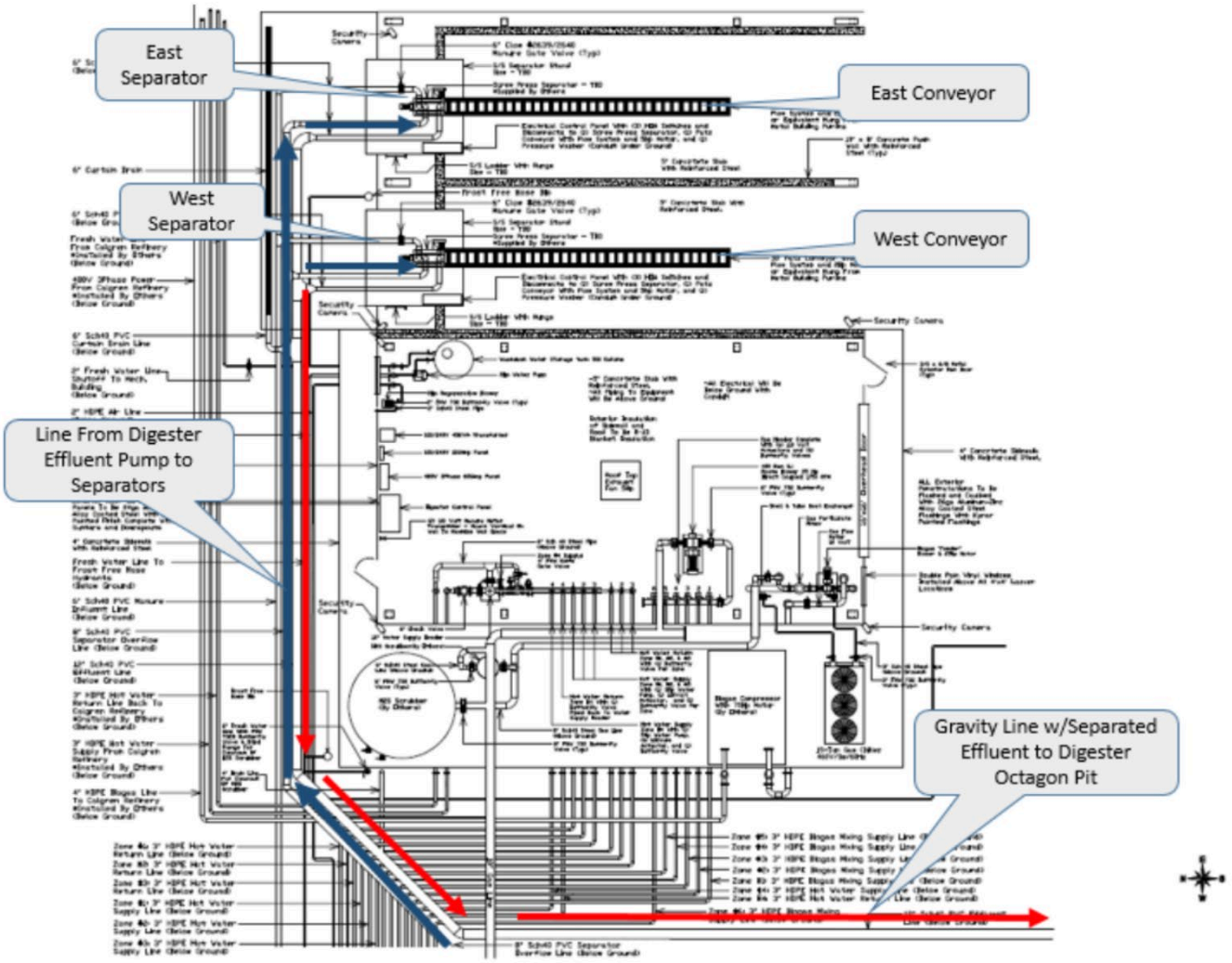
Figures 10-24 show the system layout and componentry.

Figure 10: Flare Tube

The first combustion of biogas was on 9/19/2014.

Source: Maas Energy Works, Inc

Figure 11: Manure Separation and Return

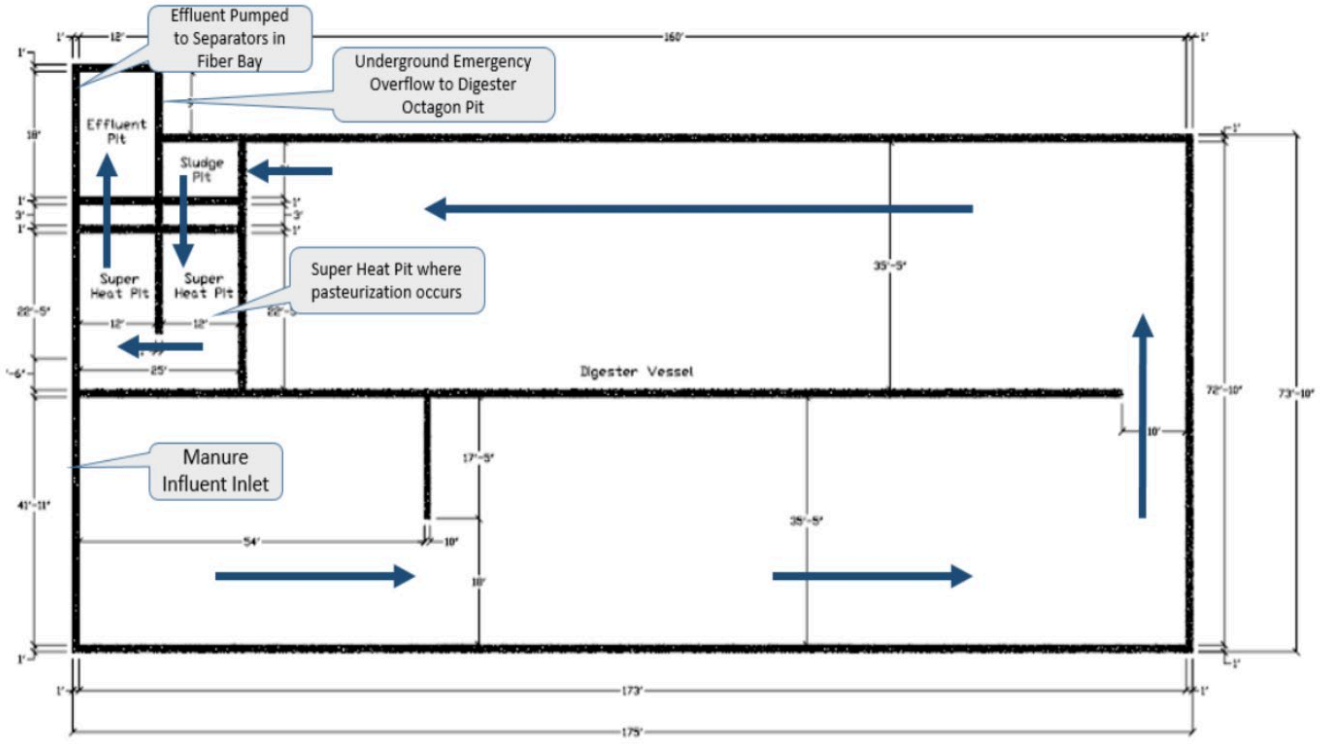


The intention is to convey the major components. Digested manure is pumped out of the Digester Vessel and sent via underground pipes to the two Screw Press Separators located in the Fiber Bays attached to the Mechanical Building.

The Separators discharge their liquid via underground gravity pipe to the Digester octagon Pit. As the put fills up, the two manure Return Pumps (one primary, one secondary) in the Dry Wall, adjacent to the put, sends liquid back down the pipeline, to the new Lined Pond at Four J Farms (the second of the projects two sites).

Source: Mass Energy Works, Inc.

Figure 12: Manure Digestion and Pasteurization



The intention is to convey the major components

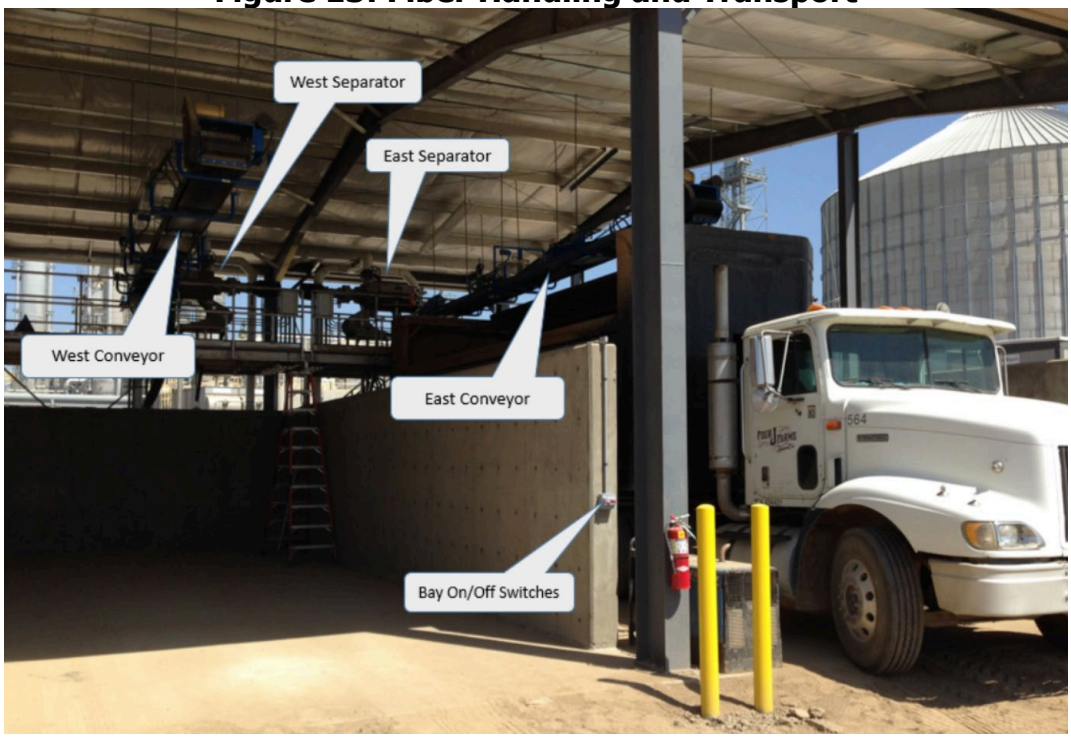
Source: Maas Energy Works, Inc.

The manure from Four J Farms' thickening system flows through a pipeline, until it enters the digester located at the digester site. The manure flows through the digester's zones over a time span of approximately three weeks, with newly arriving manure displacing, and pushing forward the old manure, such that the first gallon into the digester is, roughly, the first gallon out.

Once inside the digester, the manure is heated by hot water-filled pipes inside the vessel. The main chamber of the digester is heated to 100 degrees Fahrenheit, while the final "super-heat" section pasteurizes the manure slurry at approximately 140 degrees Fahrenheit for another 12~24 hours. The bacteria and pathogens are destroyed in the solid and liquid co-products.

The system's approximately 17-day hydraulic retention time is key to biogas production and pathogen reduction.

Figure 13: Fiber Handling and Transport



The Screw Press Separators in the Fiber Bays discharge the separated manure fiber solids onto conveyors in the Fiber Bays; which, in turn, is loaded onto trucks (or stacked on the bay floor, if not truck is present). The recycled fiber is used as animal bedding.

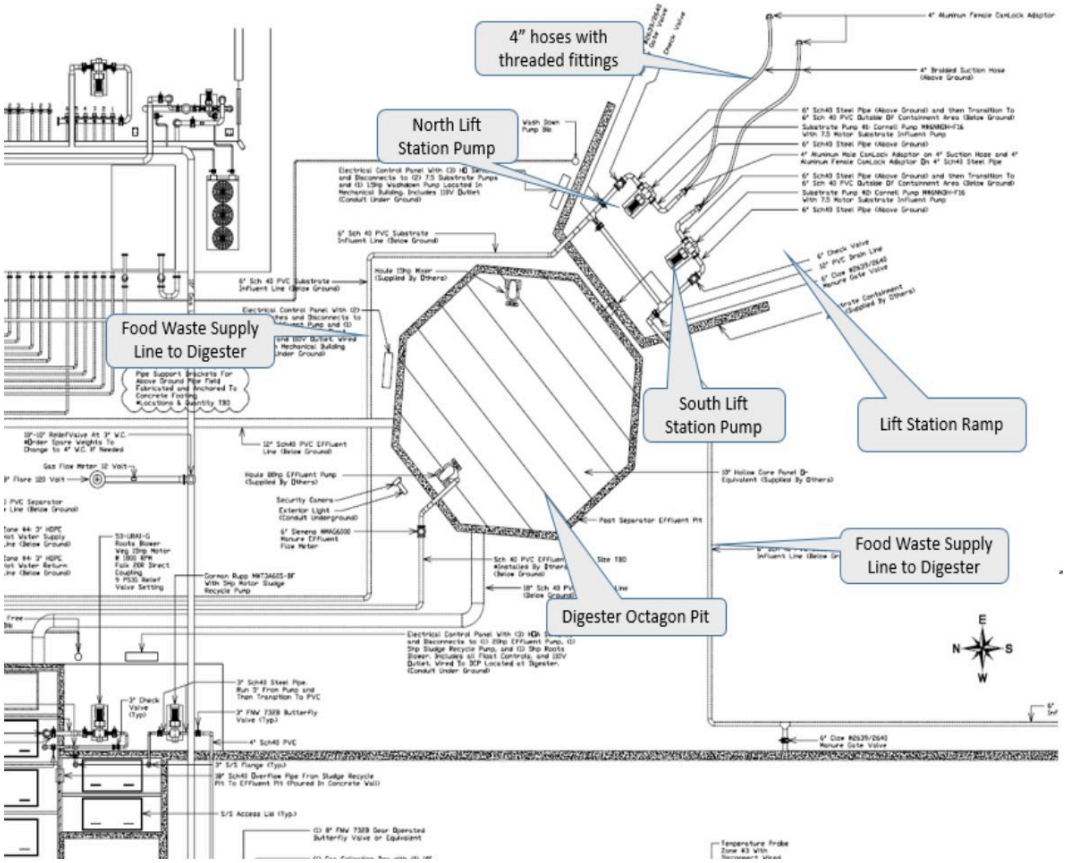
Source: Maas Energy Works, Inc.

Figure 14: Screw Press Separator System

Unattended, the dried manure solids exit hot onto conveyor and dump into open topped hauler. This vegetable fiber becomes cow bedding, then soil amendment or mulch.

Source: Maas Energy Works, Inc

Figure 15: Substrate Offloading



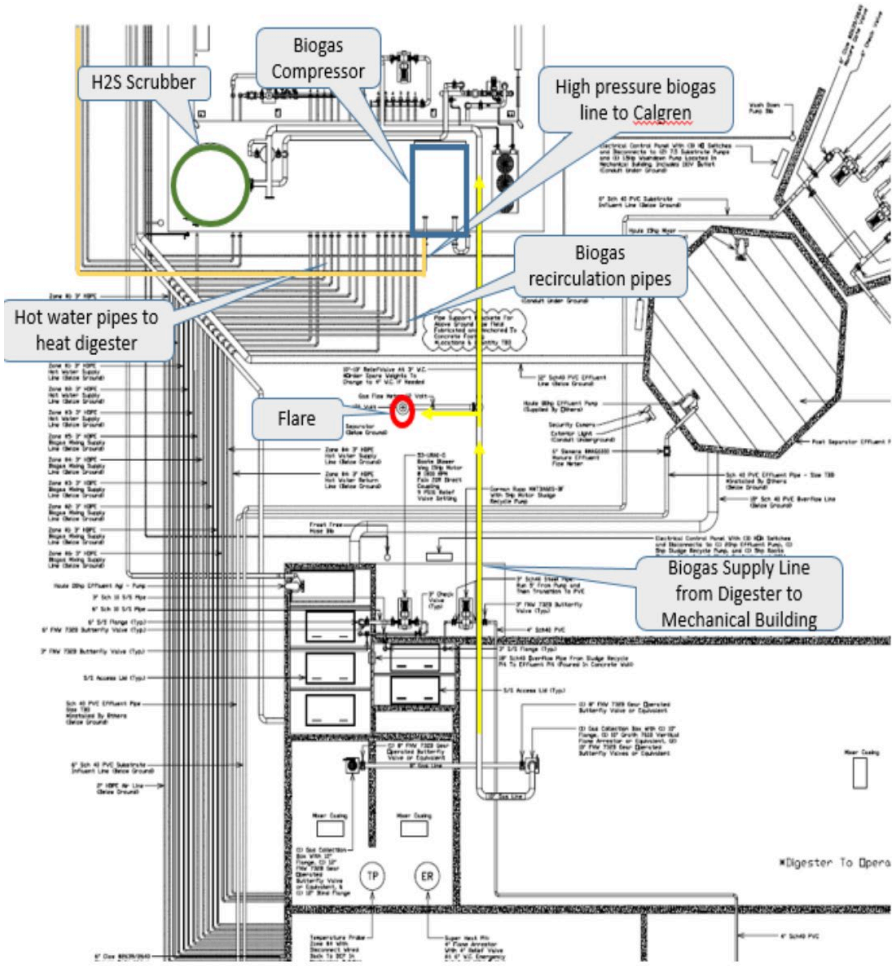
The intention is to convey the major components.

Source: Maas Energy Works, Inc.

In addition to the manure from Four J Farms, the facility also receives liquid food waste, trucked-in from a variety of customers. Trucks unload at the Lift Station ramp (upper right) adjacent to the Digester Octagon Pit, by connecting to hose fittings that empty into a tank located on the ramp. The tank is equipped with pumps that pump the food waste into the Digester.

The trucks rinse down in the Lift Station ramp area. Any spillage on that ramp drains into the Digester Octagon Pit; and from there, is pumped back to the Lined Pond at Four J Farms.

Figure 16: Biogas Handling and Transport



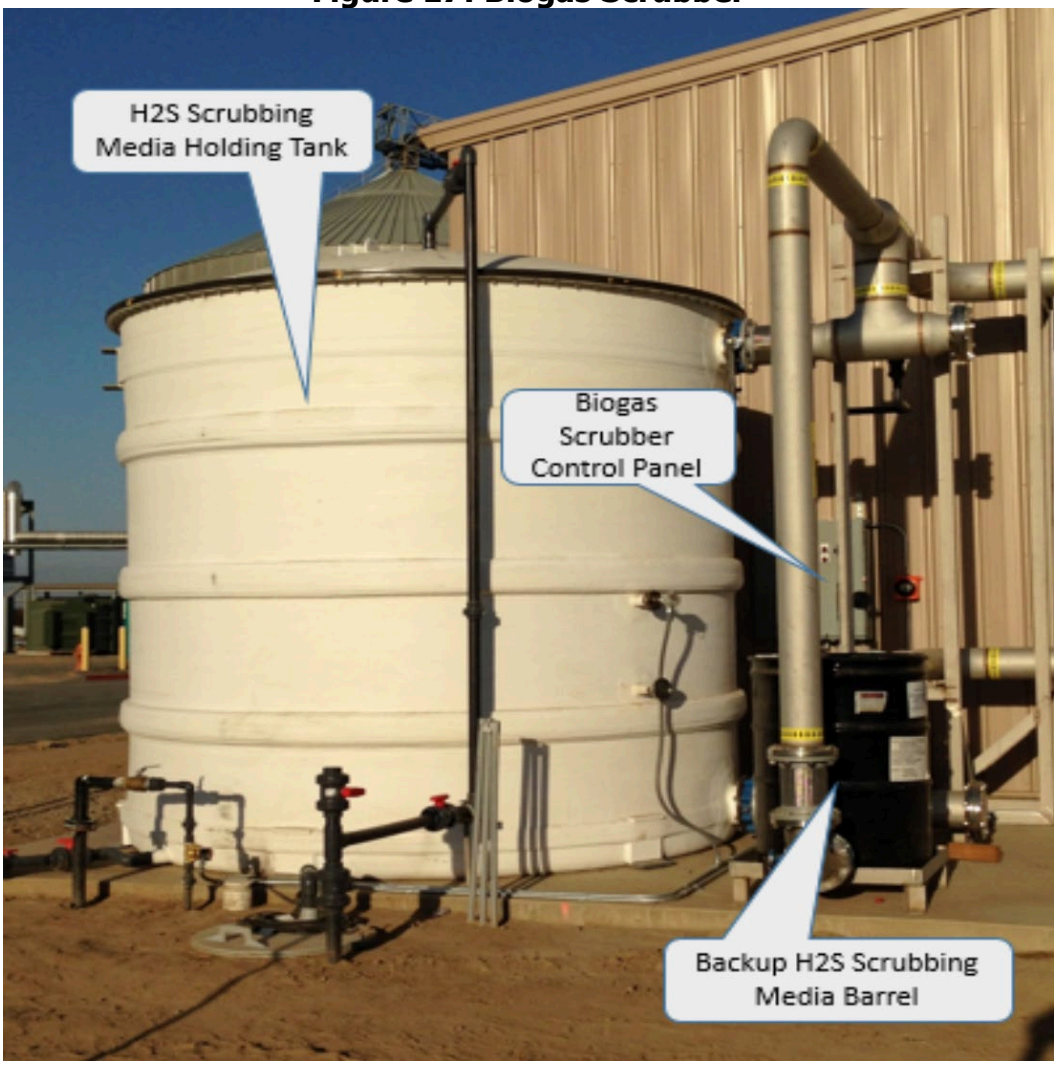
The intention is to convey the major components.

Source: Maas Energy Works, Inc.

Biogas is created in the Digester Vessel (the bottom right portion of the drawing; moves through the Biogas Scrubber (green circle upper left) into the Mechanical Building; and then flows underground to the Pixley Cogen Partners for combustion.

If the biogas is (temporarily) not able to be accepted by the cogeneration unit, it is burned in the on-site flare.

Figure 17: Biogas Scrubber



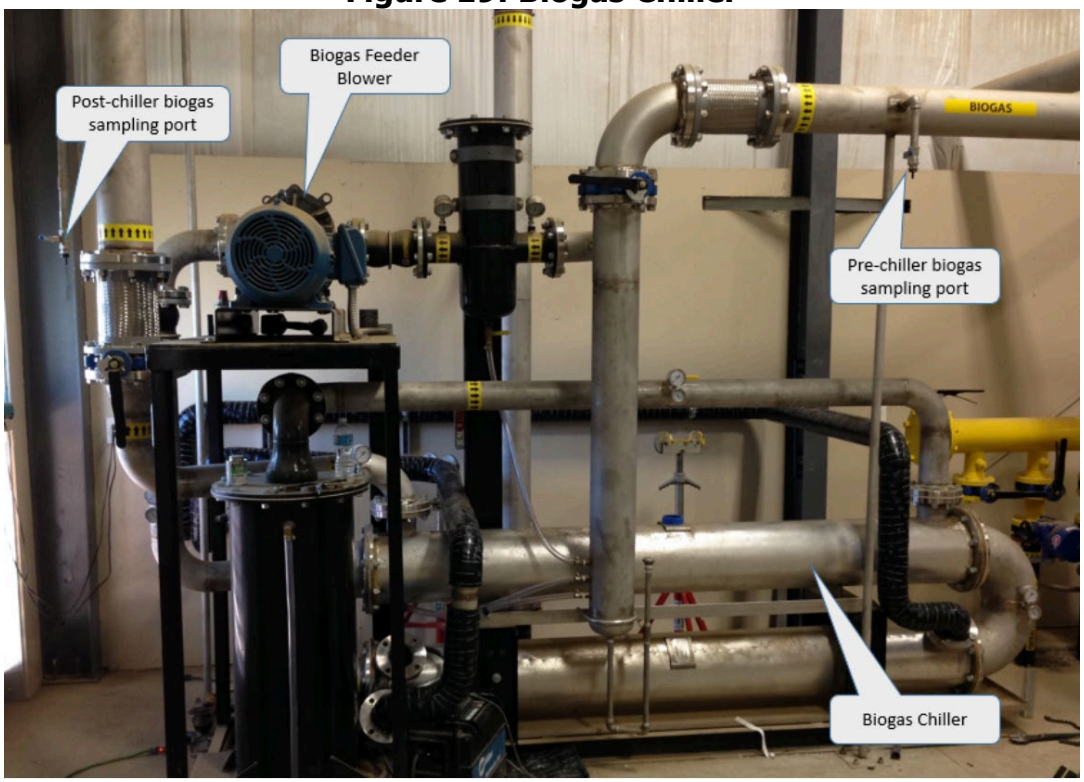
Source: Maas Energy Works, Inc.

The Biogas Scrubber contains an iron sponge media, which reduces the hydrogen sulfide that may be present in the biogas. Scrubbing is performed prior to the gas being pumped through the Biogas Chiller; then the Biogas Compressor; and finally, to the cogeneration turbine.

Figure 18: Equipment Inside the Mechanical Building

Source: Maas Energy Works, Inc.

Figure 19: Biogas Chiller



Source: Maas Energy Works, Inc.

The Biogas Chiller consists of two main subsystems: a compressor unit, located outside of the Mechanical Building (not pictured); and a tube-and-shell heat exchanger (Figure 19), for the chilling the biogas.

After the biogas exits the hydrogen sulfide scrubber, the Biogas Feeder Blower pushes the scrubbed gas into the Biogas Chiller, where it is cooled to 50-65 degrees Fahrenheit, via a two-step cooling process:

Incoming biogas is first pre-chilled by sinking heat from the incoming gas → the cool biogas exiting the chiller's heat exchanger; then, the biogas is further chilled by cold glycol from the compressor unit.

Water that precipitates from the cooled biogas is drained out of the system before the biogas is sent to the cogeneration facility.

Figure 20: Biogas Compressor and Flowmeter

Source: Maas Energy Works, Inc.

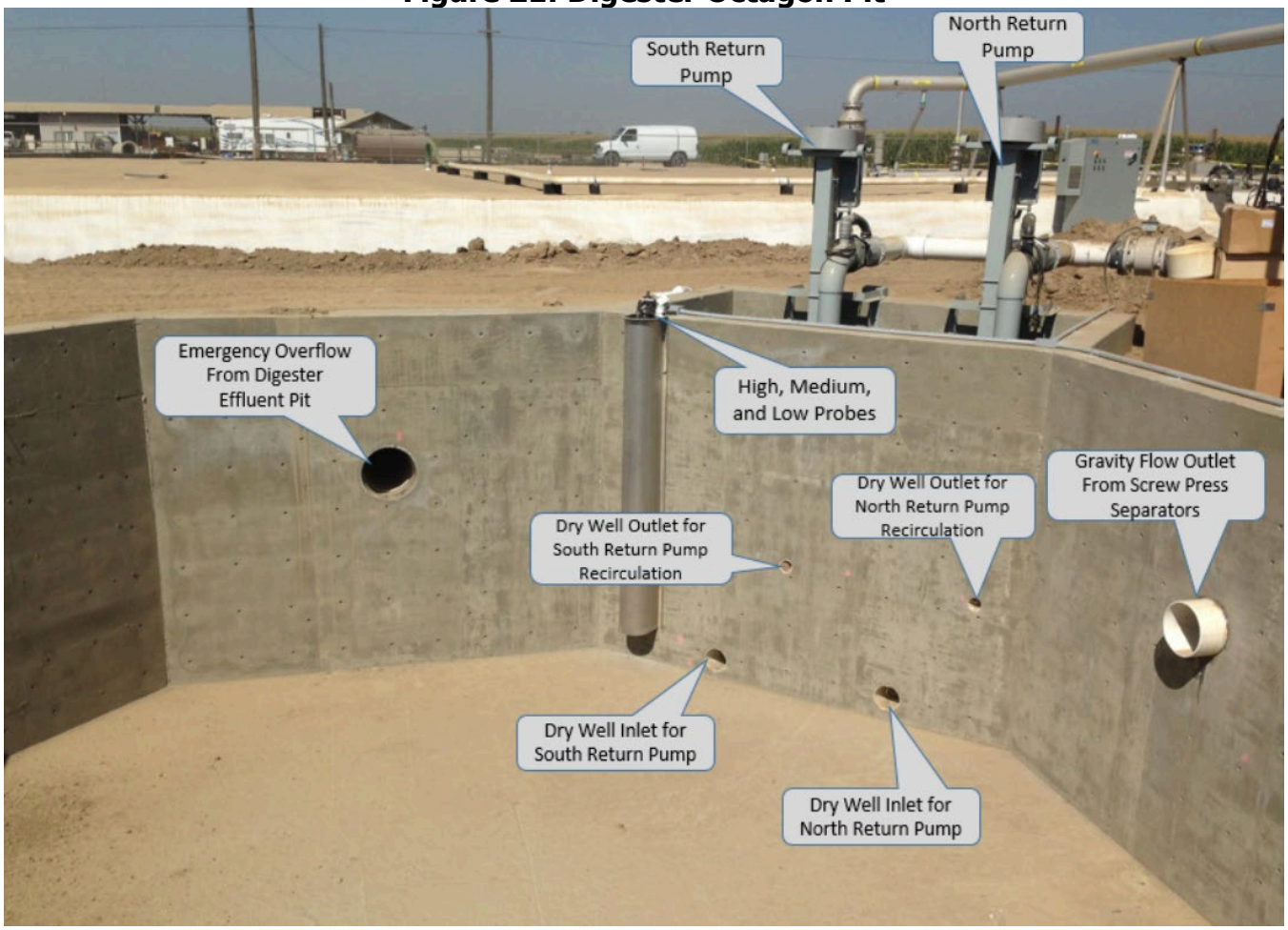
This skid of equipment receives scrubbed and chilled biogas, increasing its pressure to approximately 40 pounds per square inch (psi), for delivery to the Pixley Cogen Partners' cogeneration turbine.

The Biogas Compressor controls the rate of biogas delivery via bypassing some of its output through a variable-bypass valve.

The target rate of biogas delivery is determined by the Digester Pressure Signal received from the Digester Control Panel. If Digester pressure drops below a preset threshold, the compressor is temporarily shut down.

The Biogas Compressor is equipped with flowmeter, located directly upstream of the compressor. The flowmeter measures the Total Volume of biogas sent to Calgren.

Figure 21: Digester Octagon Pit



Source: Maas Energy Works, Inc.

This 52,000-gallon covered pit is the Pixley Biogas site's lowest drain point.

Its purpose is to receive routine flows and inadvertent overflows; contain them; and provide a location for pumping them back to the Lined Pond at Four J Farms.

There are several inlets to, and outlets from, the pit.

Feedstock and Co-products Operational Data

The goal of "Task 4 Operations" is to operate the project as designed and to collect data to document the project's fulfillment of its objectives. This report is organized in the same order as deliverables listed in the agreement Scope of Work, Task 4 Operations.

Average Operating Temperature of the Digester

Average operating temperature is recorded by probes inside the digester vessel. The data is recorded on the digester control panel and on daily paper checklists. Zones 1-3 in the main digester chamber maintain the biotic production at 100° F. Zone 4, the pasteurization section, shown in gold in Figure 22, is kept above 120° F as much as possible.

Figure 22: Digester Temperature (°F)

Source: Maas Energy Works, Inc.

Total Amount of Biogas Produced

Biogas is metered by flow meters in the biogas lines to both the flare and to the Pixley Cogen Partners customer. The biogas production stabilized to near 8,000 standard cubic feet per day by late December, in the fourth month of operation. As substrates were added in January and February of 2015, average daily production increase to approximately 150,000 standard cubic feet per day. Figure 23 below includes both sources summed together. During the period of approximately October 7 to October 12, the flow meters were not functional. During the period of approximately October 27 to November 10, flow meter errors are suspected, resulting in lower than actual readings.

Figure 23: Total Standard Cubic Feet of Biogas Produced.

Source: Maas Energy Works, Inc.

The total amount of biogas produced per month doubled from September to October and more than doubled again by December to 2.6 million standard cubic feet (Figure 23). Numbers

for early 2015 were about 50 percent higher than December 2014, showing a continuing upward trend as new feedstocks were added.

Average British Thermal Units Content of the Biogas

Handheld electronic analyzer tests for methane content, taken weekly and averaged, show from 50 – 53 percent methane in the biogas. The hydrogen sulfide content (Table 3) improved from 17.0 percent to 9.2 percent as the months went on.

Table 3: Total Biogas Produced by month

	Sept	Oct	Nov	Dec	Jan	Feb
Total Standard Cubic Feet	524,788	1,149,181	1,910,748	2,632,352	4,280,481	3,472,284
Total (Million British Thermal Units)	278.1	609.1	947.2	1339.4	2354.0	1860.1
Average Energy Content of Biogas (British thermal units/standard cubic feet)	530	530	500	510	550	530
Average CH_4 Percentage	53 percent	53 percent	50 percent	51 percent	55 percent	53 percent
Average Daily (million British thermal units)	25.29	19.65	31.57	43.21	75.93	116.25
Average hydrogen sulfide Content of hydrogen sulfide parts per million volume	17.0	13.9	9.4	9.2	3.6	4.9

Source: Maas Energy Works, Inc.

Pumped Manure Slurry Feedstock Received

An automated station mixes about 20 percent solids and 80 percent liquids for steady-state, continuous transfer one mile. All manure slurry is metered as it is pumped down the 8” diameter pipeline from the partner Four J Farms. The total received is logged manually. The variation in the graph below occurs because the daily total of manure gallons received is recorded for variable time increments, including multiple days. Proper control of manure influent volumes is critical to establishing a proper hydraulic retention time in the digester. Because of the mixed plug flow design, the first feedstock in is the first out of the 1.4-million-gallon rectangular concrete anaerobic digester vessel.

Figure 24: Manure Received

Source: Maas Energy Works, Inc.

Manure Solids Coproduct Recovered on Site

At the end of about 17 days of residence in the anaerobic digester, the methanogens have released all possible biogas from the manure and food waste. The solids are removed from the warm liquid by the Screw Press Separator System (Figure 13). At present, all digested manure solids are being delivered to Four J Farms, for storage and eventual use as cow bedding. Some delivery quantities are estimated in Table 4.

Table 4: Monthly Manure Solids (lbs)

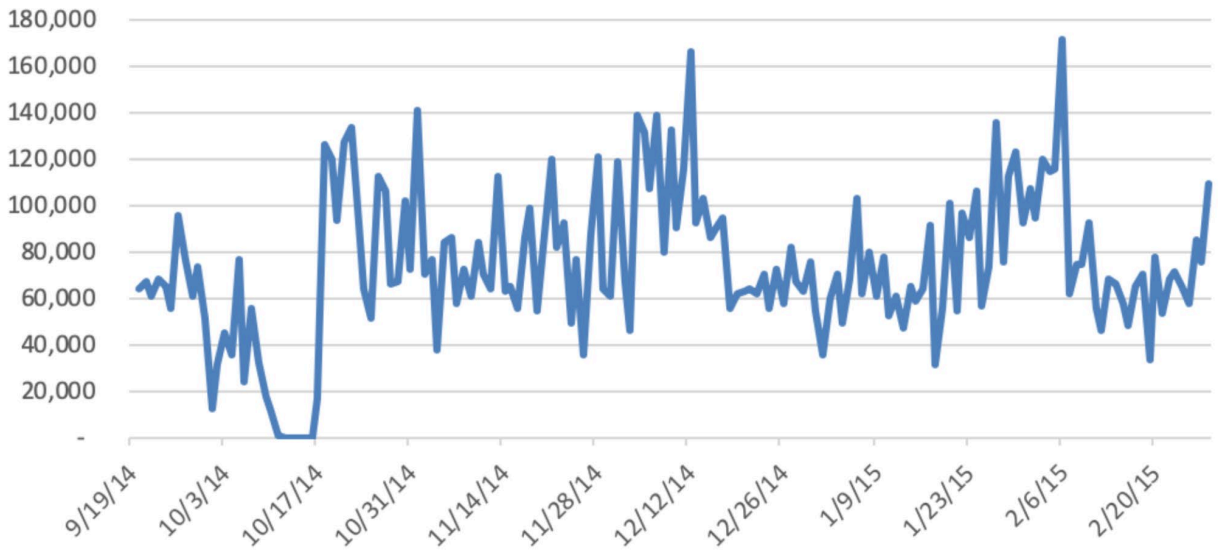
Estimated Fiber Production					
September	October	November	December	January	February
Start-up not measured	60,660	141,540	181,980	363,960	161,760

Source: Maas Energy Works, Inc.

Manure Liquid Coproduct Returned to Dairy

Manure effluent is metered as it is pumped back down the pipeline, to return it to the project's 37 million gallon, fully lined dairy lagoon. It has all the nutrients of manure and is held until needed for irrigation. As described in the Project Narrative, there was a temporary interruption in deliveries to the digester in mid-October due to a pipeline plugging, which is reflected in Figure 24 below.

Figure 25: Gallons of Manure Effluent returned to Dairy Daily



Source: Maas Energy Works, Inc.

Natural Gas Consumed by Pixley Cogen Partners as adjusted for Plant Output

The amount of natural gas consumed per gallon of ethanol produced is difficult to calculate because the Pixley Cogen Partners started up a second cogeneration turbine in September of 2014. This new turbine supplies electricity to another tenant that does not produce ethanol. Consequently, the total amount of natural gas consumed per gallon of ethanol in the table below shows an increase, even as the digester project supplied biogas to the facility in order to offset natural gas consumption.

Thankfully, the impact of the Project's supply of biogas to Pixley Cogen Partners can still be determined across a limited sample. The Project's biogas is injected not into the turbine itself but rather into the Turbine's Heat Recovery Steam Generator, whose natural gas consumption is shown in Table 5 below, third column from the right. Further to the right is plant ethanol production, and the last column on the right is the total Heat Recovery Steam Generator natural gas consumption per gallon of ethanol produced.

Since natural gas consumption is seasonal due to outside temperatures, individual months of the year must be compared against the same month from a prior year. Natural gas consumption data is only available for two months in which biogas production also occurred: January and February of 2015. During February of 2015, the ethanol plant was shut down for several days to make repairs, and then gradually restarted. This operational inconsistency invalidates the applicable natural gas consumption and ethanol production ratios for that whole month. However, during January 2015 all three requirements were met:

- Steady state ethanol production
- Biogas was flowing to the Pixley Cogen Partners Heat Recovery Steam Generator
- Prior year natural gas consumption records are available

During this one month of complete and consistent data, we can see that the digester's supply of biogas reduced Heat Recovery Steam Generator natural gas consumption from 10,945

British thermal units per gallon of ethanol in 2014 to 10,450 British thermal units per gallon of ethanol, a 4.51 percent decrease. This result is very plausible since the total amount of biogas production that month (2,354 million British thermal units) is 4.76 percent of the total 49,499 million British thermal units of fuel consumed in the Heat Recovery Steam Generator during January 2015 (natural gas plus biogas). This result validates our assumption that biogas supplied to Pixley Cogen Partners offsets natural gas consumption at a 1:1 ratio, and thus also validates our calculations of greenhouse gas offsets from reduced natural gas consumption.

Table 5: Natural Gas Use Versus Ethanol Production

Month (2014-2015)	Electicity Generated (MWh) (Turbine #1 only)	Biogas Consumed for Ethanol (mmBTU)	Total Plant Natural Gas (NG) consumed for Ethanol & Non-Ethanol uses (mmBTU)	Turbine Natural Gas consumed for Ethanol and Non-Ethanol Electricity (DTh)	Turbine Heat Rate (BTU/kWh)	HRSG Natural Gas consumed for Ethanol (mmBTU)	Ethanol Produced (gal)	HRSG Natural Gas consumed per Gallon of Ethanol Produced (BTU/gal))
January	2,467,340		90,762	38,954	15,788	51,808	4,733,481	10,945
February	2,250,448		80,654	34,698	15,418	45,956	4,302,411	10,681
March	2,416,970		88,323	37,301	15,433	51,022	4,738,085	10,768
April	2,433,052		87,651	36,781	15,117	50,870	4,697,844	10,828
May	2,570,775		89,447	37,806	14,706	51,641	4,901,700	10,535
June	2,437,264		85,495	36,174	14,842	49,321	4,649,132	10,609
July	2,465,071		84,112	36,973	14,999	47,140	4,483,087	10,515
August	2,496,334		82,159	38,370	15,370	43,789	4,119,334	10,630
September	2,381,766	278	97,961	52,030	21,845	45,931	4,639,657	9,900
October	2,409,812	609	91,799	47,778	19,826	44,021	4,190,477	10,505
November	2,290,887	947	83,223	37,191	16,234	46,033	4,121,361	11,169
December	2,340,142	1,339	111,164	62,196	26,578	48,968	4,636,455	10,562
January (2015)	1,622,282	2,354	110,382	63,289	39,012	47,094	4,506,131	10,451
February (2015)	2,243,488	1,860	77,906	33,542	14,951	44,365	3,866,622	11,474

Source: Mass Energy Works, Inc.

The startup period is from August 24, 2014 to December 31, 2014. From January 1, 2015 onwards is steady state.

Direct Operational Costs of the Project

Average operational costs will be lower in subsequent periods than the $70k/4 months shown in Table 6. Some operational supplies, one-time purchases of equipment, and other non-recurring costs posted to the Supplies and Maintenance Expense were procured during the commissioning period (August 24, 2014 to December 31, 2014).

Table 6: Direct Operational Costs to 12/31/2014

(Startup date: September 19, 2014)	
Labor	$ 6,985.68
Electricity	$ 13,022.47
Supplies and Maintenance	$ 50,176.05
Total	**$ 70,184.20**

Source: Maas Energy Works, Inc.

Operational Data from the Anaerobic Digester System

Time Operating (uptime and downtime)

The digester has produced biogas continuously since startup, and as such has never been nonoperational. The up time is 100 percent.

However, at times there have been interruptions of biogas delivery to the Pixley Cogen Partners facility. Nearly all of these interruptions were caused by controls and programming issues with the project's Biogas Compressor. The compressor controls have since been modified to nearly eliminate outages. During periods of biogas compressor failure, the digester's biogas was combusted in the onsite flare.

Table 7 below records the percentage of time, by month that the system delivered biogas to the Pixley Cogen Partners facility. During all other times, the flare was active.

Table 7: Biogas Delivery Up Time

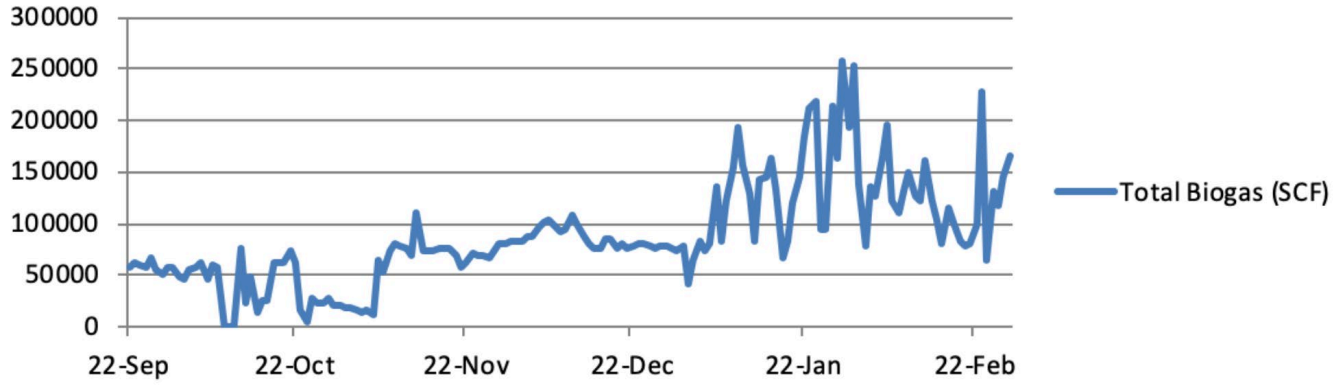
% Up Time					
September	October	November	December	January	February
99.59%	97.55%	97.39%	99.65%	99.44%	99.76%

Source: Maas Energy Works, Inc.

Biogas Production Rate

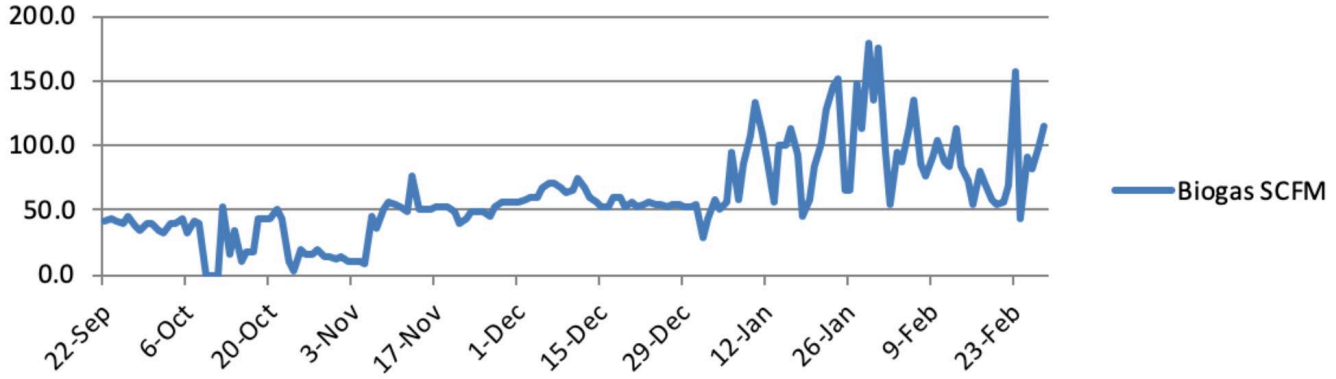
The digester's daily biogas production per gallon of influent received steadily increased toward the end of the commissioning period as seen in Figures 26 and 27. This trend indicates a stable digester, whose anaerobic bacteria are becoming more efficient at digesting the available feedstock.

Figure 26: Biogas Production Rate — Daily Standard Cubic Feet



Source: Maas Energy Works, Inc.

Figure 27: Biogas Production Rate — (Standard Cubic Feet Per Minute)

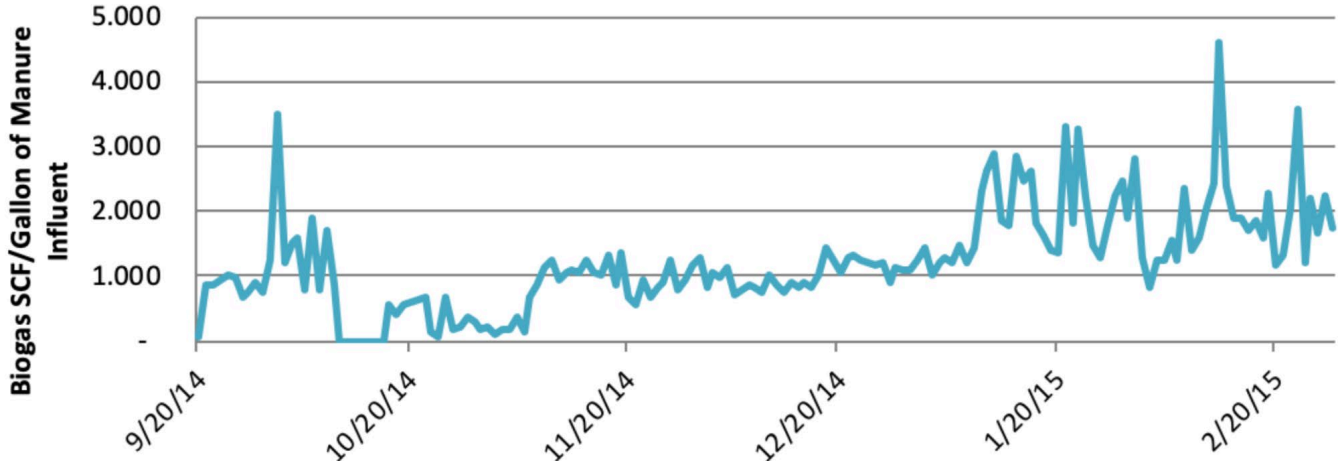


Source: Maas Energy Works, Inc.

Efficiency of Digestion of Feedstock

The digester's ratio of biomethane production per gallon of influent received steadily increased toward the end of the commissioning period, November and December 2014. Then additional feedstock increased the volume in early 2015. The daily amounts graphed in Figure 27 seem to spike because paper records are kept. The methanogens work constantly, but the staff only records production on paper periodically. The monthly average data in Table 8 shows an obvious increase in efficiency over time.

Figure 28: Digester Efficiency Biogas Produced (Standard Cubic Feet)/Gallon Feedstock



Source: Maas Energy Works, Inc.

Table 8: Digester Efficiency – Monthly Average Biogas Standard Cubic Feet/Gallon of Influent

Sept	Oct	Nov	Dec	Jan	Feb
0.778	0.631	0.863	1.021	1.949	1.877

Source: Maas Energy Works, Inc.

Quality of Biogas Produced

Note that removal of hydrogen sulfide from the biogas does not cause a significant reduction in biogas volume. Average removal is approximately 350 parts per million of gas, plus a small amount of water vapor, probably amounting to less than one tenth of one percent of the total volume. This reduction is not measurable by Pixley Biogas, LLC biogas flow metering equipment. Table 9 displays the quality of Biogas at different levels of treatment between September and February.

Table 9: Quality of Biogas

	Quality of biogas after treatment		Quality of biogas before and after upgrading system			Volume of biogas before and after treatment
	Average CH_4 percentage	Average hydrogen sulfide content of biogas	Average hydrogen sulfide pre scrubber	Average hydrogen sulfide post scrubber	Percent reduction of hydrogen sulfide	Total standard cubic feet (no significant difference after treatment)
Sept	53 percent	395.0	395.0	17	96 percent	524,788
Oct	53 percent	372.8	373.0	14	96 percent	1,149,181
Nov	50 percent	451.7	452.0	9	98 percent	1,910,748
Dec	51 percent	450.2	450.0	9	98 percent	2,632,352
Jan	55 percent	333.1	333.1	3.6	99 percent	4,280,481
Feb	53 percent	678.6	678.6	4.9	99 percent	3,472,284

Hydrogen sulfide measured in parts per million volume

Source: Maas Energy Works, Inc.

Water Quality and Nutrient Content of Digester Effluent

Almost all the nutrients of the manure remain in the watery liquid. See nutrient data in Table 10. When measuring solids in manure, analysis often makes a distinction between Total Solids and Volatile Solids. Total Solids are all non-liquid constituents present in the sample; while Volatile Solids are a subset of Total Solids, Volatile Solids are all those solids that have a calorific (food) value, and thus may be useful feedstocks for anaerobic bacteria to digest. Volatile Solids usually have a plant or animal origin; while non-Volatile Solids are usually comprised of inert material, such as ash or sand. Both are recorded in Table 10.

Table 10: Effluent Nutrient Data

	January, 2015	February, 2015
Nitrogen (lbs./1000 gal)	6.75	16.68
Phosphorus (lbs./1000 gallon)	0.72	0.44
Potassium (Lbs./1000 gallons)	3.82	2.69
Sulfate (parts per million)	7.68	2.11

	January, 2015	February, 2015
Calcium (parts per million)	258.5	189.0
Sodium (parts per million)	258.9	217.0
Chloride (parts per million)	179	192

Source: Maas Energy Works, LLC.

Beginning January 2015, the plant operator took monthly effluent samples which were fully analyzed for standardized Water Board requirements: Waste Discharge Requirements General Order for Centralized Dairy Manure Anaerobic Digester.

The plant operator did not take digester effluent samples continuously during the initial operating period. The available test data from the initial operating period is listed below in table 11.

No tests for siloxanes were performed because no cosmetic products such as soaps or detergents (the usual source of siloxanes in biogas) are being anaerobically decomposed at this time, nor are any anticipated due to limitations in the digester's solid waste permit.

Table 11: Effluent Tests

Methane Digester Effluent			
Date / Time	pH	Total Solids %	VS_{TOT}, as % of TS
11/17/14 9:00 AM	7.0	0.9	57.9
11/18/14 10:00 AM			
11/19/14 10:00 AM			
11/20/14 9:00 AM	7.3	0.7	
11/21/14 2:30 PM	8.1	0.5	45.5
11/22/14 1:00 PM	8.0	0.6	53.8
11/23/14 9:30 AM	7.9	1.0	60.0
11/24/14 4:00 PM	7.8		
11/25/14 9:00 AM	7.8	0.1	66.7
11/25/14 9:00 AM	7.8	0.1	66.7
11/26/14 1:00 PM	7.8	2.7	61.5
11/27/14 10:00 AM	7.8	0.8	56.3
11/28/14 2:00 PM	7.8	0.1	69.2
11/29/14 10:00 AM	7.7	0.6	75.0
11/30/14 12:00 PM	7.7	1.2	60.0
12/1/14 10:00 AM	7.7	0.5	73.3
12/2/14 11:30 AM	7.8	1.9	56.4
12/3/14 11:30 AM	7.8	1.7	76.5
12/4/14 11:30 AM	7.8	2.1	55.3
12/5/14 12:00 PM	7.9	1.7	61.8
12/6/14 12:00 PM	7.7	1.7	66.7
12/7/14 9:00 AM	7.8	1.4	63.3

VS_{TOT} as % of TS'= Total Volatile Solids as a Percent of Total Solids

Source: Maas Energy Works, Inc.

Quality of Biogas after Treatment

The methane content has consistently been within the expected range of 50-60 percent by volume of raw biogas. These results indicate a healthy and stable digester. (See Table 10.)

Pre-scrubber biogas hydrogen sulfide levels are significantly below the flare (unscrubbed) permit limit of 900 parts per million. The relatively low and steady levels indicate a healthy and stable digester.

Post-scrubber biogas hydrogen sulfide levels, averaging 4.25 parts per million volume for January and February 2015, are significantly below those necessary to comply with the air permit's sulfur-dioxide emissions requirements at the Pixley Cogen Partners turbine. These levels indicate that the project's hydrogen sulfide scrubber is operating effectively, removing approximately 97 percent of available hydrogen sulfide. Details are in Table 10.

Biogas Upgrading System Operating 100 percent

The biogas hydrogen sulfide filtering system provides 100 percent operational uptime scrubbing hydrogen from the biogas. The system is a static media vessel that has been continuously operating since startup. The system includes a much smaller media-filled barrel to scrub hydrogen sulfide during cleanout of the larger static media vessel. This backup capacity will enable the facility to continue supplying biogas to Pixley Cogen Partners even during media vessel cleanouts. These cleanouts are estimated to occur approximately once every year.

Volume of Biogas Before and After Treatment

Removal of hydrogen sulfide from the biogas does not cause a significant reduction in biogas volume. Average removal is approximately 350 parts per million of gas, plus a small amount of water vapor, probably amounting to less than one tenth of one percent of total volume. This reduction is not measurable by our biogas flow metering equipment (See Table 10).

Chapter 5: Analysis

Transition from the Nearly Exclusive Use of Fossil Fuels

The project supports new technology advancement for vehicles, vessels, engines, and other equipment, and promotes the deployment of such technologies in the marketplace. The project provided a measurable transition from the nearly exclusive use of petroleum fuels to a diverse portfolio of viable alternative fuels that meets California's petroleum reduction and alternative fuel use goals.

Ethanol production is enhanced. No vehicles, vessels, or engines are involved. The technology advancement is in the pipeline transportation of manure for odor control. Also innovative is the economic alliance of a dairy anaerobic digester with an industrial end user, for a simple, dependable income, compared to biomethane-to-natural-gas-pipeline sales or electricity sales burdened with short duration tariff structure. The financial stability will allow the components that are durable for 30 – 50 years to give the State of California petroleum reduction for 30 – 50 years.

Environmental Impact

Gasoline and/or petroleum-based diesel fuel that will be displaced annually.

The Pixley Biogas Anaerobic Digester project reduces the carbon intensity of Calgren's 55,000,000 gallons per year of E100 by replacing approximately 97,090,000 standard cubic feet of natural gas per year in the combined heat and power plant steam generator with biomethane from the Pixley Biogas Anaerobic Digester after the plant has grown to its current capacity to process manure and substrates. This renewable fuel is injected via a "duct burner" into the turbine exhaust stream to create process steam for the refinery. The biogas offsets some of the natural gas consumption of the combined heat and power system's duct burner, it is not making electricity. The project does not displace gasoline or diesel, other than the existing displacement created by Calgren's 55,000,000 gallons per year of E100 production.

This project will work to reduce criteria air pollutants and air toxics and reduce or avoid multimedia environmental impact, and lead to a decrease, on a life cycle basis, in emissions of water pollutants or any other substances known to damage human health or the environment.

The project reduces a substantial portion of the indirectly estimated 3,900 gallons per day of manure-laden water leakage out of the existing earthen ponds at Four J Farms, perhaps into the water table. Plus, the anaerobic digestion effluent is held in the 37 million gallons, fully lined, open dairy lagoon built by this project throughout the "rainy season" so that water can be used for crop irrigation in the hot dry summer. The project does not reduce criteria pollutants since the Pixley Cogen Partners cogeneration turbine will burn the same amount of fuel as before, emitting substantially the same quantity of criteria pollutants. However, the pollutants will be from renewable fuel instead of from fossil fuel. Renewable carbon does not have greenhouse gas impact. The greenhouse gas reduction over the first full 10 years of operations is calculated below in Table 15. The Appendix D: Solid Waste Permit tells that 489 tons per day of solid waste can be diverted from landfills to this anaerobic digestion, if they

are organics. This diversion to useful gas, liquid and solid recycling increases the human built waste systems capacity.

Qualified estimate of the project's carbon intensity values for life-cycle scale greenhouse gas emissions.

The project reduces the carbon intensity of the 55,000,000 gallon per year E100. The Pixley Cogen Partners facility uses approximately 85,000 million British thermal units of pipeline natural gas per month. According to the Calgren Renewable Fuels Method 2A/2B application (not yet approved), when the digester offsets 4 percent of the total natural gas demand with biogas (3,400 million British thermal units per month) the ethanol refinery's carbon intensity drops from 68.22 gCO_2e/MJ to 67.73 gCO_2e/MJ. Also, according to the Calgren Renewable Fuels Method 2A/2B application, if the Pixley Biogas Anaerobic Digester can offset eight percent of the total natural gas demand (6,800 million British thermal units per month) with biogas after the dairy expansion, the ethanol refinery's carbon intensity drops from 68.22 to 67.24 gCO_2e/MJ (Table 12).

Table 12: The Pixley Biogas Anaerobic Digester Influences the Carbon Intensity of the Ethanol

	Percentage biogas consumed replacing natural gas	**Ethanol Carbon Intensity (gCO_2e/MJ)**
The usual ETH003 from Low Carbon Fuel Standard	0 percent	80.70
Calgren Renewable Fuels Method 2A/2B carbon intensity calculation application to California Air Resources Board	0 percent	68.22
2A/2B application with biogas	4 percent	67.73
2A/2B application with biogas after the dairy expansion	8 percent	67.24

Pixley Biogas, LLC.

The Pixley Biogas Anaerobic Digester creates a secondary source of greenhouse gas emissions reductions via improved manure management. Untreated manure at Four J Farms would ordinarily emit methane gas into the atmosphere. The project's anaerobic digester greatly reduces these methane emissions, and these reductions can be verified under the California Air Resource Board's Livestock Protocol (Attachment E). The state regulation that re-authorized the Clean Transportation Program in 2014, Assembly Bill 8, defined the formula (greenhouse gas emission reduction during the grant demonstration period stated in grams) divided by the grant dollars equals the Benefit-Cost Score (Table 13).

Table 13: Pixley Biogas Anaerobic Digester Benefit-Cost Score

Description	Value		Notes
Days in Reporting Period	181	days	9/1/14 to 2/28/15
First Year Manure GHG Reductions	12,860	MT CO-2e	CARB Livestock Protocol Calcs, as shown in Exhibit F.
Manure GHG Reductions During Reporting Period	**6,377.2**	**MT CO-2e**	calculated
Total Biogas Supplied to PCP	7,387.9	mmBTU	Table 4
PCP Reduced Fossil NG Consumption	7,387.9	mmBTU	assume 1:1 offset ratio
CO-2 Emissions from Fossil NG	117	lbs CO-2e/mmBTU NG	Carbon Dioxide Emissions coefficients by Fuel (http://www.eia.gov/environment/emissions/co2_vol_mass.cfm)
NG GHG Reductions During Reporting Period	**392.2**	**MT CO-2e**	calculated
Total GHG Reductions During Reporting Period	**6,769.3**	**MT CO-2e**	calculated
pounds per MT	2,204.62	lb/MT	constant
grams per pound	453.592	g/lb	constant
Total GHG Reductions During Reporting Period	6,769,325,997	g CO-2e	calculated
Total CEC Funding	$4,672,798	USD	ARV 10-053
AB-8 Benefits Score	**1,448.7**	**g CO-2e/months grant $**	calculated

Source: Pixley Biogas, LLC.

The project's target biogas production is 6,800 million British thermal units per month during full production. Note that during the reporting period we only generated 7,388 million British thermal units of biogas total in six months, a low amount because it was startup and feedstocks were gradually increased over several months. The ratio of biogas to greenhouse gas reduction from natural gas offsets remains the same.

Table 14 below sums the two sources of greenhouse gas reductions generated by the project. The Pixley Biogas Anaerobic Digester greenhouse gas reductions are projected to average 20,176 CO_2e/year over eight years. The facility is built to operate for 30-50 years. Table 15 below shows the estimate total greenhouse gas reductions over the next 10 years, assuming the project achieves 50 percent of its target biogas production of 6,800 million British thermal units per month, and 100 percent of the target 6,800 million British thermal units per month in 2016. Note that the California Energy Commission Scope of Work defines the project goal as 8,000 million British thermal units per month, but the California Environmental Quality Act - modified project design and scale resulted in an engineering target of 6,800 million British thermal units per month.

Table 14: Total Pixley Biogas Anaerobic Digester Greenhouse Gas Reductions

Year	**Avoided Manure Methane (metric tons of CO2e)**	**Reduced Ethanol Greenhouse Gas Emissions (metric tons of CO2e)**	**Total (metric tons of CO2e)**
2015	12,860	2,166	15,026
2016	15,773	4,332	20,105

Year	Avoided Manure Methane (metric tons of CO2e)	Reduced Ethanol Greenhouse Gas Emissions (metric tons of CO2e)	Total (metric tons of CO2e)
2017	22,017	4,332	26,349
2018	22,152	4,332	26,484
2019	22,152	4,332	26,484
2020	22,152	4,332	26,484
2021	22,152	4,332	26,484
2022	22,152	4,332	26,484
8 Years	**161,410**	**32,488**	**193,898**
Average	**20,176**	**4,061**	**24,237**

Source: Maas Energy Works, Inc.

Note that the original project proposal to CEC predicted eight-year greenhouse gas reductions of up to 0.0539 metric tons of CO2e per $1 of CEC funds invested. Even though the project was significantly downsized and redesigned during the California Environmental Quality Act process (and in consultation with CEC), the currently calculated greenhouse gas reductions based on 8 years of operations at an average of 20,176 metric tons of CO2e/year is 0.04150 metric tons of CO2e per $1 of CEC funds invested. That amount is 77 percent of the original total, despite a dramatic reduction in the number of participating farms.

Regulatory Compliance

The project is compliant with all regulatory requirements, including its Tulare County Solid Waste Permit, its Tulare County Conditional Use Permit, its San Joaquin Valley Air Pollution Control District Authority to Construct, and all applicable Regional Water Board orders and Waste Discharge Requirements.

Capacity of Pond

The lined pond at Four J Farms has a storage capacity of approximately 37,000,000 gallons. This storage will handle the majority of Four J Farms' wastewater, which was previously handled in unlined earthen ponds. This change will eliminate most leakage from the existing ponds although they may still handle limited manure from heifers or dry cows. This leakage could not be directly quantified since no data is available on the performance of the existing ponds. However, using an engineering calculation of 1 millimeter per day of leakage, and a total earthen pond surface area of 3.66 acres at Four J Farms, the daily leakage out of the older earthen ponds can be estimated as 3,913 gallons of manure per day.

The water in the pond is expected to accumulate during the "rainy season" of November through March and be spread on the fields during the drier months of the year. This reduces groundwater usage for irrigation, while also offsetting the need to import commercial fertilizer.

Average annual rainfall in Pixley, California is 7.55 inches/year.[2]

Reclaimed Water

The Pixley Biogas Anaerobic Digester reduces a substantial portion of the indirectly estimated 3,900 gallons per day of manure leakage out of the existing earthen ponds at Four J Farms. The exact amount of this reduction will be determined by how much Four J Farms continues using their existing earthen ponds. No manure from cattle is sent to the old earthen ponds anymore, so the reduction is at least 50 percent of the estimated 3,900 gallons of leakage per day, and possibly as high as 80 percent of that amount. No effluent is disposed of via urban wastewater treatment processes.

Energy Efficiency

The Pixley Biogas Anaerobic Digester Project does not include any energy efficiency measures that would exceed Title 24 standards in Part 6 of the California Code of Regulations. These standards are for occupied buildings and common commercial equipment, none of which were involved in this project.

The digester equipment building is unoccupied, unconditioned and uninsulated. The digester vessel itself is insulated with 4 inches of spray foam insulation on the sides and roof. The digester is further insulated by being recessed into the ground with only the top 4 feet exposed. Consequently, heat loss from the digester to its environs is minimal. The digester does require heating to raise the temperature of incoming manure to the digester operating temperature of 100F, then again to at least 130F to pasteurize the manure slurry. Depending on outside temperatures, this heating demand can be as high as 2.25 million British thermal units per hour. 100 percent of this heating demand is supplied by waste heat from the Pixley Cogen Partners turbines, meaning that no excess energy is used to heat the digester.

The total efficiency of the projects production of digested fiber and biogas per unit mass of feedstock is shown in the table below. Overall, anaerobic digester energy production per unit of mass is relatively low. However, the project's ability to deliver feedstock that is mostly water means that the required feedstock transport energy is insignificant. Pumping slurry uses much less energy than trucking in the manure. Likewise, the "free" supply of waste heat from Pixley Cogen Partners means that process heat also requires only the insignificant quantity of energy to run a water pump compared to the possible scenario of burning the biogas to make biogas. These efficiencies mean that the net energy output of the facility is effectively equal to the gross energy output of the digester as seen in Table 15.

Table 15: Production per Unit Mass of Feedstock

Anaerobic Digestion Feedstock (metric tons of feedstock)	**Biogas Production** (standard cubic feet/metric tons of feedstock)	**Digested Fiber** (metric tons of feedstock)
55,376	306	0.0090
50,273	278	0.0082

[2] Average Rainfall (http://average-rainfall.findthebest.com/l/20658/Pixley-California)

Source: Maas Energy Works, Inc.

Economic Viability

The Pixley Biogas Anaerobic Digester Project's ongoing operations support approximately 2 full time equivalent positions. As of the date of this report, the property had not been assessed for property tax or personal property tax. However, at the effective 1.13 percent per annum tax rate, if the facility were assessed at half its total project cost of $10,875,834, then annual property taxes would be $61,448.

The project's target biogas production is 6,800 million British thermal units per month, which is 224 million British thermal units per day. Note that the CEC Scope of Work defines the project goal as 8,000 million British thermal units per month, but the California Environmental Quality Act -modified project design and scale resulted in an engineering target of 6,800 million British thermal units per month. During the period of this report, the average biogas production has been approximately a third of this target (see Table 3). During California Environmental Quality Act permitting the proposal to bring manure in by open truck was abandoned. Now, only one dairy supply ruminant bio-solid feedstock instead of three, reducing first year production. The future increase in project biogas production is expected to come from non-manure materials such as food waste and grease trap waste. These customers will be gradually integrated into the project over the next 6-12 months, with a corresponding increase in biogas production.

At present, the project is profitable. But with an estimated 17-year payback at anticipated biogas output levels the project is not sufficiently profitable to justify the total capital cost of $10,875,834 under normal investor return expectations. With CEC grant funding to offset that initial cost, the owner's payback is 9.72 years, which is much more acceptable and was sufficient for the owners to move forward. Although the 9.72-year return is still a relatively modest payback, the project is profitable. It is desirable as a business proposition because reduced ethanol carbon intensity is part of Calgren's strategic goals for the company.

The majority of the project revenue is from biogas sales to Pixley Cogen Partners, which offsets natural gas consumption at that affiliated facility. An additional source of revenue is the project's sale of carbon credits registered under the California Air Resource Board's Livestock Protocol. Both of these commodities are at relatively low-price levels in 2015. The projections used herein assumed a 2015 price of $5 per million British thermal units of natural gas and $8.50 per ton of carbon credits, with a 4 percent annual increase from this baseline. If prices for carbon credits or natural gas rise significantly faster, as is possible for both commodities, then the project's profits will improve substantially.

The project has demonstrated that a digester facility can create significant greenhouse gas reductions from manure management, while also reducing the carbon intensity of ethanol from a major California refinery. These greenhouse gas improvements are profitable and self-sustaining; although the return on the project probably would not have been sufficiently high to attract private equity if no CEC grant funds had been available for 42.96 percent of the project's capital costs.

Benefit-Cost Score Equals 1,449

The project demonstrated the cost-effectiveness of the proposed technology in achieving greenhouse gas emissions reduction. The Assembly Bill 8 legislation defined a metric not for the duration of a year, but for the duration of the grant "data collection" period, which was six months. The total estimated greenhouse gas reduction during the period of September 2014

through February 2015 was 6,858 metric tons CO2e/year. This number was calculated using the total number of days in the period that the project was processing manure (181) and then pro-rating the first year estimated avoided manure emissions shown in Table 15 and further explained in Appendix E. This total was 6,466 metric tons of CO_2e/year. due to manure management. To this amount we added the total Pixley Cogen Partners fossil natural gas offset by the project's generation of 7,387 million British thermal units of biogas, and assumed that biogas delivered to the Pixley Cogen Partners, LLC's turbine achieved a 1:1 offset of natural gas, to achieve 392 metric tons of CO2e emission reductions.[3]

Once the total 6,858 metric tons of CO_2e of project greenhouse gas reductions during the period of this report is converted to grams and divided by the investment by the State of California through the Clean Transportation Program grant of $4,672,798, the resultant score is a Benefit Cost Score of 1,449 grams of CO_2e for 6 months/grant dollar. This is a fantastic value for the program. Future benefits will rise as biogas production and number of cows at Four J Farms rise.

Job Creation

Total job creation impacts have been calculated using commonly-accepted methodologies from the study "Stimulus Calculations Tool—Statewide Economic Impacts of Construction Spending in California" (published in April 2009 by Sacramento Regional Research Institute, an economic research and consulting group affiliated with the Sacramento Area commerce and Trade Organization).

According to their study, every new $1,000,000 in "Infrastructure and Public Works" spending supports 6.7 direct jobs plus another 4.2 jobs through indirect and induced activities, for a total of 10.9 jobs per $1,000,000 of construction spending. Sacramento Regional Research Institute specifically includes "power plants" in its analyzed definition of Infrastructure and Public Works.

The study further concludes that in addition to employment gains, each $1,000,000 in such spending creates an additional $825,858 of output through indirect and induced activities.

The total employment and other economic impacts directly resulting from the project are summarized in the Table 16.

[3] Using CO_2 emissions factor of 53.1 kilograms $CO_{2\ per}$ million British thermal units. (Note: to convert to carbon equivalents, multiply by 12/44.) "Carbon Dioxide Emissions Coefficients by Fuel." United States Energy Information Administration, release date February 14, 2013. Accessed March 30, 2015. (http://www.eia.gov/environment/emissions/co2_vol_mass.cfm)

Table 16: Job Creation and Economic Activity

Job Creation and Economic Activity Calculations						
Per SRRI Stimulus Calculation Tool						
Total Capital Costs	$ 10,875,834					
	Direct	Indirect	Total	Wage/hr	Info Source	Duration
Construction	72.9	45.68	**118.5**			
- Laborer/Apprentice	63.87			$23	Prevailing Wage	12 months
- Craftsman	8.00			$65	Prevailing Wage	12 months
-Technician	0.50			$125	Known Contractors	12 months
- Manager	0.50			$50	Known Contractors	12 months
- Lodging, M&E		2.00		$15	Local Census.gov	12 months
- Parts and Supplies		43.68		$20	Local Census.gov	12 months
Permanent	2	1.25	**3.25**			
- Laborer/Apprentice	0.75			$23	Prevailing Wage	permanent
- Mechanic	0.8			$30	Local Census.gov	permanent
- Technician	0.10			$125	Known Contractors	permanent
- Manager	0.35			$50	Known Contractors	permanent
- Lodging, M&E		0.25		$15	Local Census.gov	permanent
- Parts and Supplies		1.00		$20	Local Census.gov	permanent
Total Constr & Permanent	74.87	46.93	**121.80**			
Additional Economic Output Through Induced and Indrect Activities					**$ 8,981,894.52**	

Source: Maas Energy Works, Inc.

The Sacramento Regional Research Institute study did not describe the estimated wages from these jobs, so we have used various sources to estimate the wages, as shown in Table 17. In addition to construction, the project will create approximately 2 additional permanent jobs in facility operations.

Wages shown above include all benefits. The location of employment varies, with the majority of construction and operation jobs taking place at the site, while indirect jobs were in nearby commercial and retail districts, such as Tulare. The Andgar Corporation staff from out-of-state consumed food, lodging and travel locally.

Future Possibilities

The project is an excellent demonstration of the potential benefits from combining an agricultural fuel source with an industrial energy user. By successfully using waste heat from the ethanol refinery and successfully using digester biogas in the ethanol's Heat Recovery Steam Generator, the project has demonstrated the mutual co-benefits of the two systems. This project, or others like it, could easily be expanded to meet most or all of the refinery's total energy supply needs. Conceivably, an ethanol facility could self-generate all of its heat and power from biogas. Depending on the design of the ethanol plant, such improvements could reduce a plant's ethanol carbon intensity below 50 gCO_2e/MJ. Due to the very large volumes of manure and other agricultural waste available in California's central valley, the potential for future agricultural-industrial combinations in ethanol, biodiesel, and general industrial energy demand is immense.

Furthermore, the project has demonstrated the viability of manure transport over distances exceeding one mile. Larger digester projects combining multiple farms could take advantage of the lessons learned to build larger and more efficient systems, whether agricultural, industrial, or both.

The project also demonstrated that non-agricultural wastes, such as grease, food waste, and other organics, can be combined with farm-based digester feedstocks and that the processed effluent from this co-digestion can be legally and safely applied to crop fields. Prior to this project, co-digestion facilities in California were exclusively urban and had to dispose of their effluent via urban wastewater treatment processes. Both solid waste and wastewater treatment volumes are diverted. Since all the nutrients of manure remain in the effluent, this "natural" fertilizer reduces the farmers' needs for commercial fertilizer. Using the effluent as a crop fertilizer greatly expands the opportunities for recycling organic wastes.

GLOSSARY

ALTERNATIVE-FUEL VEHICLE (AFV)—A vehicle designed to operate on an alternative fuel (e.g., compressed natural gas, methane blend, electricity). The vehicle could be either a dedicated vehicle designed to operate exclusively on alternative fuel or a nondedicated vehicle designed to operate on alternative fuel and/or a traditional fuel.

ALTERNATIVE AND RENEWABLE FUELS AND VEHICLE TECHNOLOGY PROGRAM (ARFVTP)—Now known as the Clean Transportation Program, created by Assembly Bill 118 (Nunez, Chapter 750, Statutes of 2007), with an annual budget of about $100 million. Supports projects that develop and improve alternative and renewable low-carbon fuels, improve alternative and renewable fuels for existing and developing engine technologies, and expand transit and transportation infrastructures. Also establishes workforce training programs, conducts public education and promotion, and creates technology centers, among other tasks.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)—An international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

CARBON DIOXIDE EQUIVALENT (CO_2e)—A metric used to compare emissions of various greenhouse gases. It is the mass of carbon dioxide that would produce the same estimated radiative forcing as a given mass of another greenhouse gas. Carbon dioxide equivalents are computed by multiplying the mass of the gas emitted by its global warming potential.

MEGAJOULE (MJ)—A joule is a unit of work or energy equal to the amount of work done when the point of application of force of one newton is displaced one meter in the direction of the force. It takes 1,055 joules to equal a British thermal unit. It takes about one million joules to make a pot of coffee. A megajoule itself totals one million joules.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA)—A federal agency created in 1970 to permit coordinated governmental action for protection of the environment by systematic abatement and control of pollution through integration or research, monitoring, standards setting, and enforcement activities.

Appendix A:
SJV Air PC District Authority to Construct

Figure A-1 shows an authority to construct permit from San Joaquin Valley Air Pollution Control District.

Figure A-1: San Joaquin Valley Authority to Construct Permit

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

AUTHORITY TO CONSTRUCT

PERMIT NO: S-8448-1-0 **ISSUANCE DATE:** 08/18/2014

LEGAL OWNER OR OPERATOR: PIXLEY BIOGAS, LLC
MAILING ADDRESS: PO BOX E
PIXLEY, CA 93256

LOCATION: 11704 ROAD 120
PIXLEY, CA 93256

EQUIPMENT DESCRIPTION:
ANAEROBIC MANURE AND FOOD WASTE DIGESTER SERVED BY A DIGESTER GAS H2S REMOVAL SYSTEM AND AN ANDGAR CORPORATION 36.16 MMBTU/HR EMERGENCY USE FLARE

CONDITIONS

1. All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201]
2. No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
3. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
4. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
5. The sulfur content of the digester gas flared shall not exceed 900 ppmv as H2S. [District Rule 4801]
6. Only digester gas shall be combusted in the flare. [District Rule 2201]
7. Flare shall be equipped with a non-resettable, totalizing flare gas volume flow meter. [District Rule 4311]
8. The flare will be operated only in emergency situation; no testing or maintenance is allowed. [District Rules 2201 and 4311]
9. A flame shall be present at all times whenever combustible gases are vented through the flare. [District Rule 4311]
10. The flare shall be equipped with an automatic ignition system [District Rule 4311]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

Arnaud Marjollet, Director of Permit Services

S-8448-1-0 : Aug 18 2014 12:07PM -- DAVIDSOS : Joint Inspection Required with DAVIDSOS

Southern Regional Office • 34946 Flyover Court • Bakersfield, CA 93308 • (661) 392-5500 • Fax (661) 392-5585

Printed on recycled paper.

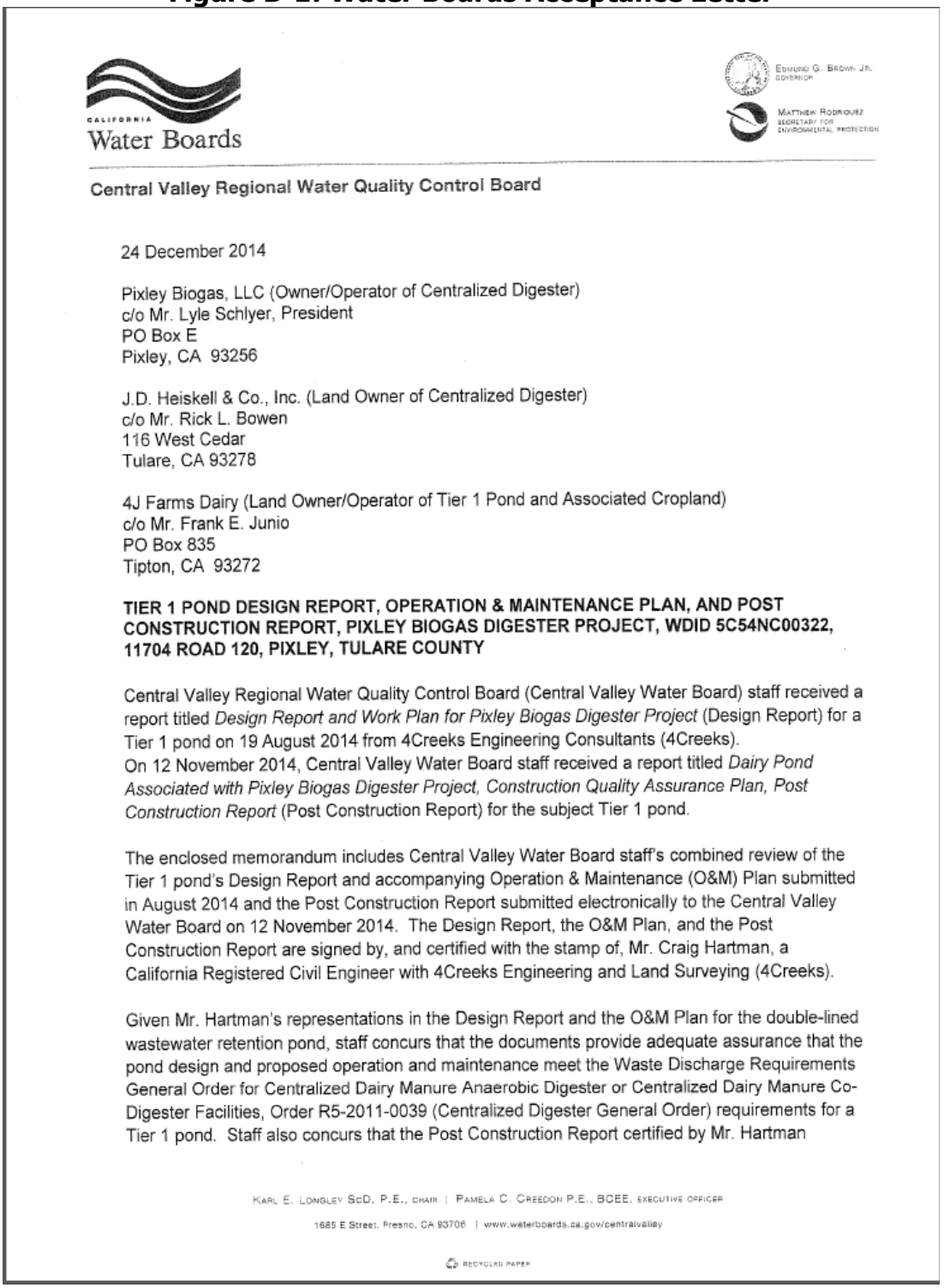
11. The sulfur content of the digester gas combusted in this flare shall be monitored and recorded at least once every calendar quarter. If quarterly monitoring shows a violation of the digester gas sulfur content limit of this permit, monthly monitoring will be required until six consecutive months of monitoring show compliance with the digester gas sulfur content limit. Once compliance with the digester gas sulfur content limit is shown for six consecutive months, then the monitoring frequency may return to quarterly. Monitoring of the sulfur content of the digester gas fuel shall not be required if the flare does not operate during that period. Records of the results of monitoring of the digester gas fuel sulfur content shall be maintained. [District Rule 2201]
12. Monitoring of the digester gas sulfur content shall be performed using Gas Processors Association Standard 2377; ASTM Method D1072, D3246, D4084, D4810, or D5504; EPA Method 11 or 15; ARB Method 11; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1; or an alternative method approved by the District. [District Rule 2201]
13. The operator shall notify the APCO of an unplanned flaring event within 24 hours after the start of the next business day or within 24 hours of their discovery, whichever occurs first. The notification shall include the flare source identification, the start date and time, and the end date and time. [District Rule 4311]
14. Copies of approved flare minimization plan pursuant to Rule 4311 Section 6.5 shall be made readily available to the APCO, ARB, and EPA upon request for a minimum of 5 years. [District Rule 4311]
15. The operator of a flare subject to flare minimization plans pursuant to Section 5.8 shall submit an annual report to the APCO that summarizes all Reportable Flaring Events as defined in Rule 4311 Section 3.0 that occurred during the previous 12 month period. The report shall be submitted within 30 days following the end of the twelve month period of the previous year [District Rule 4311]
16. The permittee shall maintain all records of emergency operations. Records shall include the location, date, number of hours of each emergency flaring operation, and the amount of gas burned [District Rule 2201 and 4311]
17. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. Records may be maintained and submitted in an electronic format approved by the District. [District Rules 1070, 2201, and 4311]

Source: Maas Energy Works, Inc.

Appendix B:
CVR Water QC Board Pond Acceptance

Figure B-1 is a copy of the letter issued by the Cental Valley Regional Water Quality Control Board regarding the Pixley Biogas, LLC digester project.

Figure B-1: Water Boards Acceptance Letter



CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

24 December 2014

Pixley Biogas, LLC (Owner/Operator of Centralized Digester)
c/o Mr. Lyle Schlyer, President
PO Box E
Pixley, CA 93256

J.D. Heiskell & Co., Inc. (Land Owner of Centralized Digester)
c/o Mr. Rick L. Bowen
116 West Cedar
Tulare, CA 93278

4J Farms Dairy (Land Owner/Operator of Tier 1 Pond and Associated Cropland)
c/o Mr. Frank E. Junio
PO Box 835
Tipton, CA 93272

TIER 1 POND DESIGN REPORT, OPERATION & MAINTENANCE PLAN, AND POST CONSTRUCTION REPORT, PIXLEY BIOGAS DIGESTER PROJECT, WDID 5C54NC00322, 11704 ROAD 120, PIXLEY, TULARE COUNTY

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff received a report titled *Design Report and Work Plan for Pixley Biogas Digester Project* (Design Report) for a Tier 1 pond on 19 August 2014 from 4Creeks Engineering Consultants (4Creeks).
On 12 November 2014, Central Valley Water Board staff received a report titled *Dairy Pond Associated with Pixley Biogas Digester Project, Construction Quality Assurance Plan, Post Construction Report* (Post Construction Report) for the subject Tier 1 pond.

The enclosed memorandum includes Central Valley Water Board staff's combined review of the Tier 1 pond's Design Report and accompanying Operation & Maintenance (O&M) Plan submitted in August 2014 and the Post Construction Report submitted electronically to the Central Valley Water Board on 12 November 2014. The Design Report, the O&M Plan, and the Post Construction Report are signed by, and certified with the stamp of, Mr. Craig Hartman, a California Registered Civil Engineer with 4Creeks Engineering and Land Surveying (4Creeks).

Given Mr. Hartman's representations in the Design Report and the O&M Plan for the double-lined wastewater retention pond, staff concurs that the documents provide adequate assurance that the pond design and proposed operation and maintenance meet the Waste Discharge Requirements General Order for Centralized Dairy Manure Anaerobic Digester or Centralized Dairy Manure Co-Digester Facilities, Order R5-2011-0039 (Centralized Digester General Order) requirements for a Tier 1 pond. Staff also concurs that the Post Construction Report certified by Mr. Hartman

KARL E. LONGLEY SCD, P.E., CHAIR | PAMELA C. CREEDON P.E., BCEE, EXECUTIVE OFFICER

1685 E Street, Fresno, CA 93706 | www.waterboards.ca.gov/centralvalley

RECYCLED PAPER

provides adequate documentation that the pond was constructed in accordance with the plans, specifications, and construction quality assurance procedures specified in the Design Report.

If you have any questions regarding this matter, please call Stephen Klein at (559) 445-5558.

FOR Pamela C. Creedon
Executive Officer

Enclosure

cc: Tulare County Resource Management Agency, Visalia
Tulare County Health and Human Services Agency, Visalia
Mr. Daryl Maas, Redding
Mr. Craig Hartman, 4Creeks Engineering and Land Surveying, Visalia

Source: Maas Energy Works, Inc.

Appendix C:
Notice of Determination 2/19/14

Figure C-1 is a notice of determination from Tulare County Resource Management Agency issued to Pixley Biogas LLC detailing project location and description.

Figure C-1: Copy of Notice of Determination

NOTICE OF DETERMINATION

Fee Exempt per Government Code Section 6103

FILED
TULARE COUNTY
FEB 19 2014
ROLAND P. HILL
ASSESSOR/CLERK RECORDER
BY:

To: Office of Planning and Research
1400 Tenth Street, Rm113
Sacramento, CA 95814

Lead Agency: Tulare County Resource Management Agency
5961 South Mooney Boulevard
Visalia, CA 93277

Applicant(s): Pixley Biogas, LLC
PO Box E
Pixley, CA 93256

Subject: **Filing of Notice of Determination in Compliance with Section 21108 or 21152 of the Public Resources Code**

Project Title: Special Use Permit No. PSP 10-060

State Clearinghouse Number: 2012-111057

Contact Person: Hector Guerra **Telephone Number:** 559-624-7000

Project Location: On the east side of Road 120, approximately 2,600 feet south of Avenue 120, in the community of Pixley. APN: 295-050-003 (11518 Road 120) and APN: 295-030-001 (11704 Road 120); Sections 20 & 30, Township 22 South, Range 25 East, MDB&M.

Project Description/Case File No: Special Use Permit/ Final Site Plan No. PSP 10-060/PSR to allow the development of a biogas facility for the extraction of methane gas, via an anaerobic digester, on a ±1.28-acre portion of a 24.53-acre parcel in the PD-M-1 (Planned Development – Light Manufacturing) Zone, for use by the Calgren Renewable Fuels facility adjacent to the subject site on the north. The digester will be located on APN: 295-050-003 and the stormwater retention basin will be relocated to APN: 295-030-001.

This is to advise that the TULARE COUNTY PLANNING COMMISSION has approved the above-described project on **February 5, 2014** and has made the following determinations regarding the above-described project:

1. The project ( ) will (X) will not have a significant adverse impact on the environment.
2. (X) A Final Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ( ) A Mitigated Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
   The environmental document and record of project approval may be examined at:
   5961 S Mooney Blvd., Visalia CA 93277
3. Mitigation Measures (X) were ( ) were not made a condition of approval of the project.
4. A Statement of Overriding Considerations ( ) was (X) was not adopted for the project.

By: _____ 2/18/14
Hector Guerra Date
Chief Environmental Planner

By: _____ 2/18/14
Michael C. Spata Date
Environmental Assessment Officer
Associate Director – T CResource Management Agency

(X) Dept of Fish & Wildlife Fees Req'd
(X) E.I.R.
( ) MND
( ) N.D.

Filed with the Tulare County Clerk on _____, 2013
cc: California. Dept. of Fish & Wildlife, 1416 Ninth St., 12th Floor, Sacramento, CA 95814
Note: Authority cited: Section 21083, Public Resource Code; Reference: Sections 21108, 21152 and 21167, Public Resource Code.

Source: Maas Energy Works, Inc.

Appendix D:
Solid Waste Permit

Figure D-1 is a copy of the Solid Waste Facility Permit issued to Pixley Biogas, LLC by the Tulare County Health and Human Services Agency.

Figure D-1: Copy of Solid Waste Facility Permit

SOLID WASTE FACILITY PERMIT

Facility Number: 54-AA-0053

1. Name and Street Address of Facility:	2. Name and Mailing Address of Operator:	3. Name and Mailing Address of Owner:
PIXLEY BIOGAS 11518 ROAD 120 PIXLEY, CA 93256	PIXLEY BIOGAS LLC 11704 ROAD 120 PIXLEY, CA 93256	JD HEISKELL HOLDINGS LLC 11518 ROAD 120 PIXLEY, CA 93256

4. Specifications:

a. Permitted Operations:
- ☐ Solid Waste Disposal Site
- ☒ Transfer/Processing Facility (Anaerobic Digester)
- ☐ Composting Facility
- ☐ Transformation Facility
- ☐ Other: ____

b. Permitted Hours of Operation: 24 Hours per day, 7 days per week.

c. Permitted Maximum Tonnage: 489.6 Tons per Day

d. Permitted Traffic Volume: 12 Vehicles per Day

e. Key Design Parameters (Detailed parameters are shown on site plans bearing EA and CalRecycle validations):

	Total	Disposal	Transfer/Processing	Composting	Transformation
Permitted Area (in acres)	1.28	0	1.28		
Design Capacity (TPD)			489.6		
Max. Elevation (Ft. MSL)					
Max. Depth (Ft. MSL)					
Estimated Closure Year					

Upon a significant change in design or operation from that described herein, this permit is subject to revocation or suspension. The attached permit findings and conditions are integral parts of this permit and supersede the conditions of any previously issued solid waste facility permit.

5. Approval:

NILSA GONZALEZ
ENVIRONMENTAL HEALTH DIRECTOR

Approving Officer Signature

Nilsa Gonzalez

6. Enforcement Agency Name and Address:

TULARE COUNTY
HEALTH & HUMAN SERVICES AGENCY
ENVIRONMENTAL HEALTH SERVICES DIVISION
5957 SOUTH MOONEY BLVD.
VISALIA, CA 93277

7. Date Received by CalRecycle: September 4, 2014

8. CalRecycle Concurrence Date: September 26, 2014

9. Permit Issued Date:	10. Permit Review Due Date:	11. Owner/Operator Transfer Date:
September 29, 2014	September 29, 2019	

Page 1 of 4

SOLID WASTE FACILITY PERMIT

Facility Number: 54-AA-0053

12. Legal Description of Facility:

N1/2 Of SW ¼ Sec. 20, T.22S., R.25E., M.D.B.&M., APN# 295-050-003

13. Findings:

a. This permit is consistent with the Tulare County Integrated Waste Management Plan, which was approved by CalRecycle on October 18, 2005 pursuant to Public Resources Code (PRC), Section 50001(a). The location of the facility is identified in the County of Tulare Non-disposal Facility Element, pursuant to PRC, Section 41800 or 41801.5.

b. This permit is consistent with the standards adopted by CalRecycle, pursuant to PRC 44010.

c. The design and operation of the facility is consistent with the State Minimum Standards for Solid Waste Handling and Disposal as determined by the enforcement agency, pursuant to PRC 44009.

d. The City of Tulare Fire Department has determined that the facility is in conformance with applicable fire standards, pursuant to PRC, 44151.

e. An Environmental Impact Report was filed with the State Clearinghouse (SCH #201211057) and adopted by the Tulare County Planning Commission on February 18, 2014. The Environmental Impact Report describes and supports the design and operation of the Anacrobic Co-Digestion Facility/Transfer Processing Station, which will be authorized by the issuance of this permit. A Notice of Determination was filed with the State Clearinghouse on February 19, 2014.

14. Prohibitions:

The permittee is prohibited from accepting the following wastes:

Hazardous, radioactive, medical waste (as defined in Chapter 6.1, Division 20 of the Health and Safety Code), asbestos-containing wastes, ashes, designated, or other wastes requiring special treatment or handling, except as identified in the Transfer/Processing Report and approved amendments thereto and as approved by the enforcement agency.

Exemptions:

Hazardous or designated waste found as a result of a Hazardous Waste Exclusion/Load-Check Program shall be stored as identified in the Transfer/Processing Report and approved amendments thereto and as approved by the enforcement agency.

15. The following documents describe and/or restrict the operation of this facility:

	Date		Date
Transfer/Processing Report	August 14, 2014	Environmental Impact Report	December, 2013
Special Use Permit PSP # 10-60/PSR	February 5, 2014	Notice of Determination SCH # 201211057	February 19, 2014

SOLID WASTE FACILITY PERMIT	Facility Number: 54-AA-0053

16. Self-Monitoring:

The owner/operator shall submit the results of all self-monitoring programs to the Enforcement Agency within 30 days of the end of the reporting period (for example, 1st quarter = January-March, the report is due by April 30, etc. Information required on an annual basis shall be submitted with the 4th quarter monitoring report, unless otherwise stated).

Program	Reporting Frequency
a. The types and quantities (in tons) of waste, including separated or commingled recyclables, entering the facility per day.	Monthly
b. The number and types of vehicles using the facility per day.	Monthly
c. Results of the hazardous waste load checking program, including the quantities and types of hazardous wastes, medical wastes or otherwise prohibited wastes found in the waste stream and the disposition of these materials.	Upon Request
d. Copies of all written complaints regarding this facility and the operator's actions taken to resolve these complaints.	Per Occurrence
e. An employee training log with dates of training and course descriptions. This shall be maintained and kept current.	Maintain Onsite

SOLID WASTE FACILITY PERMIT	Facility Number: 54-AA-0053

17. **Enforcement Agency (EA) Conditions:**

a. The operator shall comply with all State Minimum Standards for solid waste handling and disposal as specified in Title 14, California Code of Regulations (14 CCR).

b. The operator shall adhere to the terms of this permit and Transfer Processing Report and amendments thereof.

c. The operator shall maintain a log of special/unusual occurrences. This log shall include, but is not limited to, fires, explosions, the discharge and disposition of hazardous or unpermitted wastes, and significant injuries, accidents or property damage. Each log entry shall be accompanied by a summary of any actions taken by the operator to mitigate the occurrence. The log shall be available to site personnel and the EA at all times.

d. Additional information concerning the design and operation of the facility shall be furnished upon request and within the time frame specified by the EA.

e. The maximum permitted daily tonnage for this facility is 489.6 tons per day and this facility shall not receive more than this amount without a revision of this permit.

f. This permit is subject to review by the EA and may be suspended or revoked at any time by the EA for sufficient cause in accordance with Division 30 of the Public Resources Code, Part 4, Article 2, Section 44305 et seq and associated regulations.

g. The EA reserves the right to suspend or modify waste receiving and handling operations when deemed necessary due to an emergency, a potential health hazard, or the creation of a public nuisance.

h. Any change that would cause the design or operation of the facility not to conform to the terms and conditions of this permit is prohibited. Such a change may be considered a significant change, requiring a permit revision. In no case shall the operator implement any change without first submitting a written notice of the proposed change, in the form of a TPR amendment, to the EA at least 180 days in advance of the change.

i. The following activities are prohibited:

1) Public or Employee Scavenging

2) Vector propagation and harborage

3) Off-site migration of waste, litter, and leachate to prevent contact with the public; and

4) Burning waste

j. A copy of this permit and the current Transfer Processing Report as amended or approved by the EA shall be maintained at the facility and available to site personnel and the EA at all times.

k. Load Checking for hazardous waste shall be performed in accordance with standards prescribed in 14 CCR, Section 17409.5.

Source: Maas Energy Works, Inc.

Appendix E:
Manure Emissions Reductions

The project's greenhouse gas emission reductions from avoided manure methane emissions are calculated using formulas provided by the California Air Resources Board Livestock Protocol. Figure E-1 below is the summary page from a much larger workbook. The project's 12,860 metric tons of CO_2e emissions reductions for Four J Farms is the difference the between the baseline case ("no project") and the project case ("digester") emissions.

Figure E-1: Methane emission reductions

II.A.iii. Total Modeled Baseline Methane Emissions [Equation 5.2]

BE_{CH4} (MT) =	548.74	tonnes CH_4 $year^{-1}$
BE_{CH4} (CO_2e) =	13,718.48	tonnes CO_2e $year^{-1}$

II.A.iv. Total Baseline Carbon Dioxide Emissions $CO_{2(MSC)}$ (CO2e)

	0.00	tonnes CO_2 $year^{-1}$

II.B. Total Project Emissions

II.B.i. Project Methane Emissions from the BCS

CH_4(BCS) (MT) =	24.99	tonnes CH_4 $year^{-1}$
CH_4(BCS) (CO_2e)	624.63	tonnes CO_2e $year^{-1}$

IIB.ii. Methane Emissions from Venting Events

$CH_{4,vent,i}$ (MT)	0.00	tonnes CH_4 $year^{-1}$
$CH_{4,vent,i}$ (CO_2e)	0.00	tonnes CO_2e $year^{-1}$

II.B.iii. Project Methane Emissions from the BCS Effluent Pond

CH_4(EP) (MT) =	9.36	tonnes CH_4 $year^{-1}$
CH_4(EP) (CO_2e)	233.90	tonnes CO_2e $year^{-1}$

II.B.iv. Project Methane Emissions from Non-BCS-Related Sources

CH_4(nonBCS sources) (MT) =	0.00	tonnes CH_4 $year^{-1}$
CH_4(nonBCS sources) (CO_2e)	0.00	tonnes CO_2e $year^{-1}$

II.B.v. Total Project Methane Emissions [Equation 5.5]

PE_{CH4} (MT)	34.34	tonnes CH_4 $year^{-1}$
PE_{CH4}(CO_2e) =	858.54	tonnes CO_2e $year^{-1}$

II.B.vi. Total Project Carbon Dioxide Emissions $CO_{2(MSC)}$ (CO2e)

0.00	

II.C. Comparison of Modeled Methane Reductions to Total Quantity of Destroyed Methane

(BE_{CH4} (MT) - PE_{CH4} (MT)) =	514	tonnes CH_4 $year^{-1}$
$CH_{4,destroyed}$ (MT) =	1113	tonnes CH_4 $year^{-1}$
Note: The Total Methane Reductions (below) will be equal to the lesser of the two values above.		
Total Methane Reductions (MT) =	514	tonnes CH_4 $year^{-1}$
Total Methane Reductions (CO_2e) =	12,860	tonnes CO_2e $year^{-1}$

II.D. Total Emission Reductions (CH_4 and CO_2) [Equation 5.1]

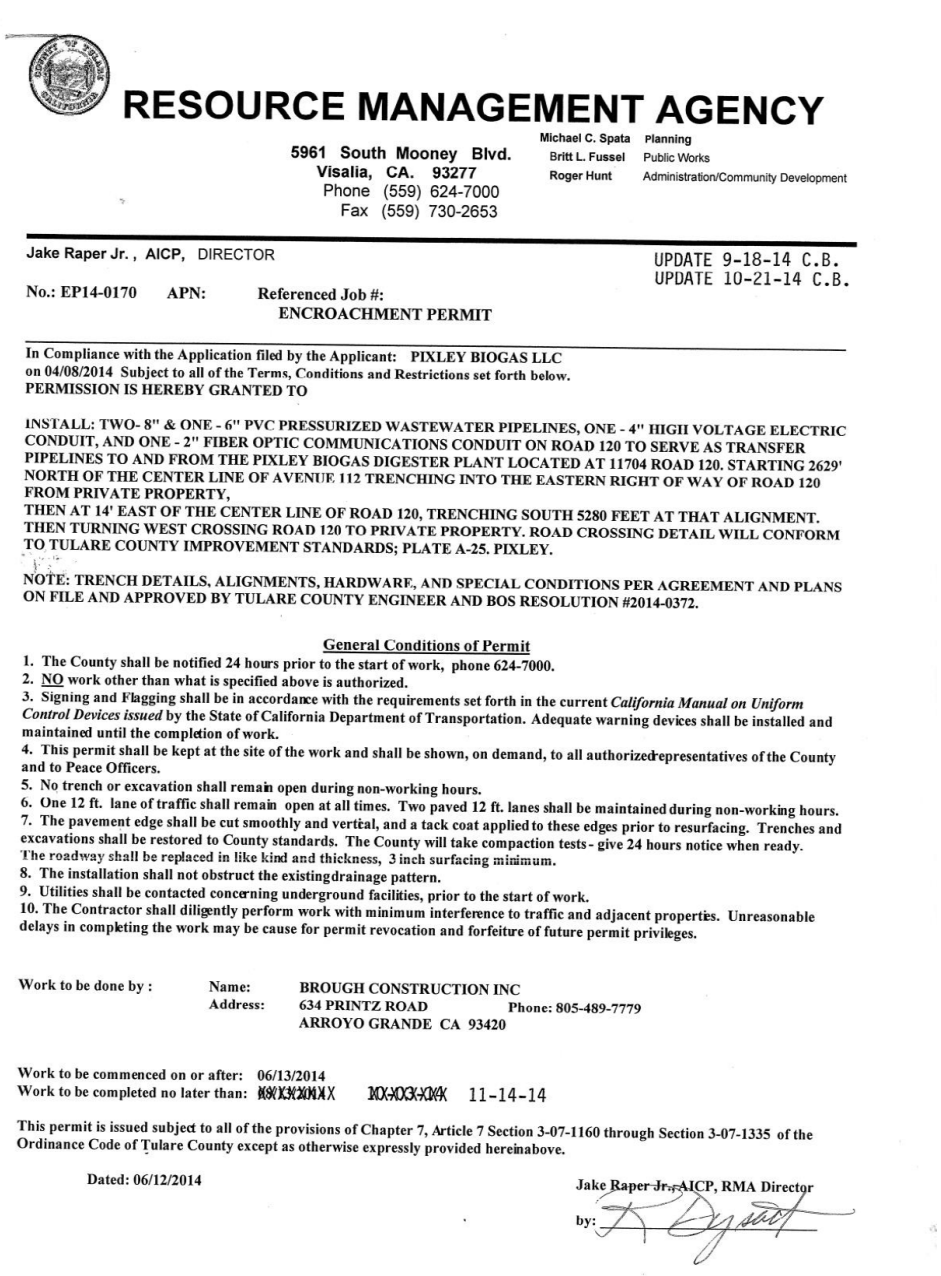
Total Emission Reductions (MT CO_2e/yr) =	12,860	tonnes CO_2e $year^{-1}$

Source: Maas Energy Works, Inc.

Appendix F:
Tulare County Encroachment Permit

Figure F-1 is a copy of the encroachment permit executed in 2014 from the Resource Management Agency.

Figure F-1: Copy of Encroachment Permit



RESOURCE MANAGEMENT AGENCY

5961 South Mooney Blvd.
Visalia, CA. 93277
Phone (559) 624-7000
Fax (559) 730-2653

Michael C. Spata — Planning
Britt L. Fussel — Public Works
Roger Hunt — Administration/Community Development

Jake Raper Jr., AICP, DIRECTOR

UPDATE 9-18-14 C.B.
UPDATE 10-21-14 C.B.

No.: EP14-0170 APN: Referenced Job #:
ENCROACHMENT PERMIT

In Compliance with the Application filed by the Applicant: PIXLEY BIOGAS LLC on 04/08/2014 Subject to all of the Terms, Conditions and Restrictions set forth below. PERMISSION IS HEREBY GRANTED TO

INSTALL: TWO- 8" & ONE - 6" PVC PRESSURIZED WASTEWATER PIPELINES, ONE - 4" HIGH VOLTAGE ELECTRIC CONDUIT, AND ONE - 2" FIBER OPTIC COMMUNICATIONS CONDUIT ON ROAD 120 TO SERVE AS TRANSFER PIPELINES TO AND FROM THE PIXLEY BIOGAS DIGESTER PLANT LOCATED AT 11704 ROAD 120. STARTING 2629' NORTH OF THE CENTER LINE OF AVENUE 112 TRENCHING INTO THE EASTERN RIGHT OF WAY OF ROAD 120 FROM PRIVATE PROPERTY,
THEN AT 14' EAST OF THE CENTER LINE OF ROAD 120, TRENCHING SOUTH 5280 FEET AT THAT ALIGNMENT. THEN TURNING WEST CROSSING ROAD 120 TO PRIVATE PROPERTY. ROAD CROSSING DETAIL WILL CONFORM TO TULARE COUNTY IMPROVEMENT STANDARDS; PLATE A-25. PIXLEY.

NOTE: TRENCH DETAILS, ALIGNMENTS, HARDWARE, AND SPECIAL CONDITIONS PER AGREEMENT AND PLANS ON FILE AND APPROVED BY TULARE COUNTY ENGINEER AND BOS RESOLUTION #2014-0372.

General Conditions of Permit

1. The County shall be notified 24 hours prior to the start of work, phone 624-7000.
2. NO work other than what is specified above is authorized.
3. Signing and Flagging shall be in accordance with the requirements set forth in the current *California Manual on Uniform Control Devices issued* by the State of California Department of Transportation. Adequate warning devices shall be installed and maintained until the completion of work.
4. This permit shall be kept at the site of the work and shall be shown, on demand, to all authorized representatives of the County and to Peace Officers.
5. No trench or excavation shall remain open during non-working hours.
6. One 12 ft. lane of traffic shall remain open at all times. Two paved 12 ft. lanes shall be maintained during non-working hours.
7. The pavement edge shall be cut smoothly and vertical, and a tack coat applied to these edges prior to resurfacing. Trenches and excavations shall be restored to County standards. The County will take compaction tests - give 24 hours notice when ready. The roadway shall be replaced in like kind and thickness, 3 inch surfacing minimum.
8. The installation shall not obstruct the existing drainage pattern.
9. Utilities shall be contacted concerning underground facilities, prior to the start of work.
10. The Contractor shall diligently perform work with minimum interference to traffic and adjacent properties. Unreasonable delays in completing the work may be cause for permit revocation and forfeiture of future permit privileges.

Work to be done by : Name: BROUGH CONSTRUCTION INC
Address: 634 PRINTZ ROAD Phone: 805-489-7779
ARROYO GRANDE CA 93420

Work to be commenced on or after: 06/13/2014
Work to be completed no later than: XX-XX-XXXX XX-XX-XXXX 11-14-14

This permit is issued subject to all of the provisions of Chapter 7, Article 7 Section 3-07-1160 through Section 3-07-1335 of the Ordinance Code of Tulare County except as otherwise expressly provided hereinabove.

Dated: 06/12/2014

Jake Raper Jr., AICP, RMA Director
by:

Source: Maas Energy Works, Inc.

Appendix G: Tulare County Conditional Use Permit California Environmental Quality Act Approval

Figure G-1 is a copy of the conditional use permit from Tulare County executed in February 2014.

Figure G-1: County of Tulare Permit No. PSP 10-060

RECORDING REQUESTED BY:
Resource Management Agency
AND WHEN RECORDED MAIL TO:
Resource Management Agency
5961 S. Mooney Blvd.
Visalia Ca 93277

2014-0010077

Recorded Official Records County of Tulare ROLAND P. HILL Clerk Recorder	REC FEE	868.00
02:22PM 26-Feb-2014	NB Page 1 of 282	

THIS SPACE FOR RECORDER'S USE ONLY

PSP 10-060

THIS PAGE ADDED TO PROVIDE ADEQUATE SPACE FOR RECORDING INFORMATION
(ADDITIONAL RECORDING FEE APPLIES)

12/04

CR-16 (11/11)

BEFORE THE PLANNING COMMISSION

COUNTY OF TULARE, STATE OF CALIFORNIA

IN THE MATTER OF A FINAL ENVIRONMENTAL IMPACT REPORT FINDINGS OF FACT, AND MITIGATION MONITORING AND REPORTING PROGRAM FOR SPECIAL USE PERMIT NO. PSP 10-060 (DIGESTER FACILITY) ANAEROBIC DIGESTER, AND COMPRESSED NATURAL GAS FACILITY	) RESOLUTION NO. 8927

WHEREAS, this resolution of the Planning Commission (Commission) of the County of Tulare certifying the Final Environmental Impact Report (SCH # 2012111057) ("Final EIR"), for the Pixley Biogas Project, as being in compliance with the California Environmental Quality Act ("CEQA") and the State CEQA Guidelines;

WHEREAS, this resolution adopting the Final EIR, Finding of Fact, and the Mitigation Monitoring and Reporting Program for Special Use Permit No. PSP PSP 10-060;

WHEREAS, the owner and applicant Calgren Renewable Fuels (Calgren) (Owner: GFP Ethanol, LLC, dba Calgren Renewable Fuels, LLC, 11798 Road 120, Pixley, CA 93256) originally filed an application with Tulare County Resource Management Agency ("RMA") to allow the development of a biogas facility for the extraction of methane gas, via an anaerobic digester, on a 1.28-acre portion of an 8.16-acre parcel for use by the Calgren Renewable Fuels facility adjacent to the subject site on the south including APNs: 295-030-001, 295-040-001, 295-050-003, 295-260-002. Through this process the applicant and opposing parties Pixley Biogas, CDI, and 3R Land agreed to place the digester component of this project to a 1.28-acre portion of an 24.530 acre parcel (the JD Heiskell Site) Assessor Parcel No. 295-050-003. (See Exhibit "A" See Site Plan.), pursuant to Section 65905 of the Government Code and regulations contained in Section 16 of the Tulare County Ordinance No. 352.

WHEREAS Section 16 of Ordinance No. 352, as amended, of the zoning ordinance allows Biomass Fuel Manufacture, commercial, in the M-1 Zone, subject to approval of a special use permit.

WHEREAS biomass is a term used to describe a variety of biological materials, including but not limited to, the organic portion of municipal trash (garbage, paper, etc.), sewage, trees, plants, manures, and various agricultural and forestry wastes and in this instance, it applies to manure and Fat, Oil, and Grease (FOG).

WHEREAS "biomass" as used in the County Ordinance, "biomass" materials are those materials which can be used directly as a fuel or can be converted to a variety of clean, useful

fuels such as alcohol, methane, hydrogen and low BTU gas and whether used directly or after conversion, biomass can be used to produce electricity, heat, and combustible fuels.

WHEREAS Section 18.6 of Ordinance No. 352, as amended, states that where a specific plan has been adopted for any area or tract of land in the PD Zone, a final site plan shall be required.

WHEREAS, an Initial Study and Mitigated Negative Declaration was originally published in April 29, 2011, and comments were made in opposition to the Project by the California Dairies Inc, 3R Land & Development, LLC (3R Land) and the Pixley Town Council and agents on their behalf of these organizations at the Commission Public Hearings on June 8, 2011 and June 22, 2011,

WHEREAS, the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) was originally published on November 15, 2012 and comments received from CDI, and 3R Land on December 14, 2012 by their agents Baker Manock and Jensen (BMJ), PC, Provost and Prichard (P and P), and Young Wooldridge (YW), the NOP was Amended and re-noticed on June 13, 2013, and additional comments received from BMJ and YW, the San Joaquin Valley Air Pollution Control District (the District) and CalRecycle and their Local Enforcement Agent (LEA) Keith Janke.

WHEREAS, the applicant had previously met with the Pixley Town Council, California Dairies Inc, and 3R Land prior to the meetings and has addressed their concerns in the design of the Project,

WHEREAS, staff has addressed the concerns of the Central Regional Water Quality Control Board through utilizing and by incorporating by reference the entirety of the Dairy Manure Digester and Co-digester Facilities Draft Program Environmental Impact Report SCH No. 2010031085 (July 2010),

WHEREAS, staff has addressed CalReycle's concerns by utilizing and incorporating by reference the Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste Draft and Final Program Environmental Impact Report SCH No. 2010042100 (2010),

WHEREAS, all exhibits referenced herein, are hereby incorporated by reference;

WHEREAS, site plans depicting the nature, extent and location of this project, are attached together as Exhibit "A";

WHEREAS, staff of the Tulare County RMA has conducted the necessary investigations (including environmental review of this matter); prepared written Staff Reports (made a part hereof) for Special Use Permit No. PSP 10-060; prepared the Environmental Impact Report, and provided additional information affecting these land use applications at the public hearings

noticed, convened and conducted for this matter; and based on substantial evidence, submitted these land use applications for the consideration of, and action by the Commission;

WHEREAS, prior public hearings were conducted for this matter in meetings of the Commission held on June 8th and June 22nd of 2011;

WHEREAS, the public testimony portion of the hearing was continued;

WHEREAS, oral testimony and documentary evidence relating to this applicant was received from RMA staff, the applicants, representatives, and various public entities and interested parties, and such testimony and evidence were duly considered by the Commission;

WHEREAS, the Environmental Assessment Officer (EAO) reviewed and authorized the processing of the Draft Environmental Impact Report (DEIR), and now the Final Environmental Impact Report (FEIR) prepared for Special Use Permit No. PSP 10-060;

WHEREAS, staff amended the Notice of Preparation prepared for the Project and circulated it again on October 2, 2012 to the responsible agencies, interested groups and individuals for a 30-day review period ending Thursday November 1, 2012;

WHEREAS, the proposed Project information was referred to various public agencies and pertinent departments for review and recommendations;

WHEREAS, the first public scoping meeting was held on November 1, 2012 and a second one was held on June 27, 2013, at the Tulare County Resource Management Agency Main Conference Room;

WHEREAS, a Draft EIR was released on October 9, 2013, which included detailed responses to the comments that were received on the DEIR and incorporated into the FEIR. The EIR included a discussion on the resources evaluated and found to be impacted by the Project. These include: (a) Aesthetics, (b) Agriculture, (c) Air Quality; (d) Cultural Resources, (e) biological resources, (f) Geology/Seismic & Soils, (g) Minerals, (h) Noise, (i) Population/Housing Balance, (j) Public Services / Facilities, (k) Traffic / Circulation, (l) Hazards and Hazardous Materials, (m) Hydrology and Water Quality, (n) Land Use and Planning, (o) Public Services, and (p) Utilities and Services;

WHEREAS, on October 9, 2013, a Notice of Availability of Draft Environmental Impact Report and Notice of Public Hearing were duly published in the Visalia Times-Delta, a newspaper of general circulation in Tulare County;

WHEREAS, on October 8, 2013 Tulare County distributed the Notice of Completion and Environmental Document Transmittal to the State Clearinghouse with the requisite number of copies of the Draft Environmental Impact Report to be mailed to affected public agencies and interested parties, indicating a 45-day review period commencing on October 9, 2013, and ending

on November 25, 2013 pursuant to the California Environmental Quality Act ("CEQA"), Public Resources Code Section 21000, and State and Agency Guidelines adopted pursuant thereto;

WHEREAS, the proposed Project information was referred to various public agencies and pertinent departments for review and recommendations;

WHEREAS, written comments were submitted during the public comment period by various public agencies and members of the public, and after due consideration thereof, written responses were prepared for said comments by Staff;

WHEREAS, on December 30, 2013, a Notice of Public Hearing and Completion of Environmental Documents were duly sent to surrounding properties and published in the Visalia Times-Delta, a newspaper of general circulation in Tulare County;

WHEREAS, on or about December 26, 2013, a copy of the written responses to the timely public comments was duly sent by email and mail to the State Clearinghouse and the commenting public agencies and on December 27, 2013 to interested parties in a manner that public agencies and interested parties received the responses at least 10 days before the action on this matter;

WHEREAS, in accordance with state law and local ordinance, Staff has given due notice in writing of the public hearing regarding the proposed Final Environmental Impact Report, Findings of Fact, and Mitigation Monitoring and Reporting Program that would be held for the purpose of receiving comment on the environmental documents (SCH #2012111057) for the proposed solid waste composting, anaerobic digester, and compressed natural gas facility Special Use Permit No. PSP 10-060, as described herein;

WHEREAS, the Mitigation Measures found in the Mitigation Monitoring and Reporting Program (MMRP) and attached as Exhibit "C" hereto, are hereby incorporated by reference herein, and are deemed to be Conditions of Approval (COA) for this project for which the applicant is responsible to implement and that will be enforced by the Tulare County Resource Management Agency;

WHEREAS, the Final EIR was published on RMA's web site on December 30, 2013;

WHEREAS, a Final Environmental Impact Report ("Final EIR" or "FEIR") for the Project (State Clearinghouse #2012111057) has been prepared pursuant to CEQA and the State CEQA Guidelines, and incorporates the Final EIR with changes and revisions thereto, written Responses to Comments made during the CEQA review period, and the Mitigation and Monitoring Program;

WHEREAS, said FEIR as described herein is hereby incorporated by reference;

WHEREAS, a Findings of Fact (Exhibit "B"), Mitigation Monitoring and Reporting Program (Exhibit "C"), Comments to and Response to Planning Commission Hearing Comments (Exhibit "D"), pursuant to the Final Environmental Impact Report, were prepared by Tulare County staff and reviewed and approved for public review by the Tulare County Environmental Assessment Officer;

WHEREAS, this resolution certifies that Findings of Fact (Exhibit "B"), Mitigation Monitoring and Reporting Program (Exhibit "C"), Comments to and Response to Planning Commission Hearing Comments (Exhibit "D"), pursuant to the Final Environmental Impact Report, has been prepared for the purpose of the proposed anaerobic digester and compressed natural gas facilities;

WHEREAS, this resolution of the Commission relates to the certification and approval of the Final Environmental Impact Report, of the Findings of Fact, and the Mitigation Monitoring Reporting Program for Pixlay Biogas, all of which being in compliance with the California Environmental Quality Act ("CEQA") and the State CEQA Guidelines;

WHEREAS, the Commission considered and certified and approved the Final Environmental Impact Report (State Clearinghouse #2012111057) and approved the Findings and Mitigation Monitoring and Reporting Program contained within the attached documents adequately addressed the impacts of the proposed Project, were prepared in accordance with the California Environmental Quality Act, and reflected the independent judgment of the County;

WHEREAS, on January 8, 2014, staff presented evidence to the Commission;

WHEREAS, at that meeting of the Planning Commission an opportunity for public testimony was received and recorded from Lyle Schlyer and Daryl Maas, representing the applicant, and Sharon Herbert, representing the Pixley Town Council, and who spoke in support of the project. In summarizing why those in favor of the project supported the project, Sharon stated that the Pixley Town Council thought that it was a great Project but said there was one Proviso on the Project requiring both parties to continue to discuss this Project in hopes to resolve their issues.

WHEREAS, Michael Wyatt, representing CDI, Ralph Friend, representing 3R Land, Charlie Pitigliano, Jr., a local farmer, Ila Feer, a neighbor, Chris Campbell, attorney for CDI, and Manuel Acevedo, CDI manager, spoke in opposition to the project. In summarizing why those in opposition spoke in regard to why they opposed the project: (1) they all stated they agreed with the project's purpose as a digester, but that they did not want the project located at that site, (2) that their previous Comments that were cited in the Response to Comments Chapter of the FEIR were not thoroughly discussed in the Response to Comments Section of the FEIR; and (3) the Mitigation Measures were not "enforceable" and cited to the Odor Impact Minimization Plan (OIMP), an Odor Management Plan (OMP), and Spill Management Plan, as project features that were not being actually required by the County as Mitigation Measures and contained

[discretionary and not mandatory] language, i.e., "should" verses "shall" in reference to the requirements of these three regulatory agency requirements and were not enforceable locally.

WHEREAS, the Planning Commission closed the public comment portion of the public hearing and, upon motion by Commissioner Millies and a second by Commissioner Elliott, the public hearing was continued to January 22, 2014 in order to allow Staff the opportunity to evaluate in good faith the testimony provided at the public hearing on January 8, 2014 and respond effectively and meaningfully.

WHEREAS, the Commission, as an authorized body to independently review and make the determination that the environmental document has been prepared in accordance with the California Environmental Quality Act (CEQA) and is the Decision Making Body for environmental documents for Special Use Permits, and as such is empowered to certify and approve the Pixley Digester EIR on January 8, 2014;

WHEREAS, the Commission closed the public testimony portion of the hearing on January 8, 2014;

WHEREAS, the Planning Commission finds that Staff did consider the rail line stub in the Project Description on page 2-15 and in the Site Plan in Appendix N of the FEIR the analysis for the proposed stormwater retention basin.

WHEREAS, in regard to the Proposed land use under the zoning requirements PD-M-1 (Planned Development – Light Manufacturing) Zone or North Pixley Specific Plan, the Enterprise Zone, and potential impacts from "obnoxious odor and dust" under the current zoning and finds concurrently with the FEIR that there will be less than significant impacts from dust or odor from the project, and therefore, no "obnoxious dust or odors" that are not allowed under the existing zoning are being emitted from the Project.

WHEREAS, the Planning Commission finds that in fact the requirement for a Spill Management Plan (SPM) is located within the Mitigation Measures of the FEIR and MMRP and is found as Mitigation Measure 9-2, and is referred to as CalRecycle Measure 6.2c: on Page 8-17 of the MMRP and Page 3.9-26 of the FEIR, and is referred to under US EPA Regulations, as a Spill Prevention, Control and Countermeasure Plan (SPCC) Plan (or Spill Management Plan), in the FEIR, and the Spill Management Plan is located in the Appendix I of the FEIR and Notification of the SPCC shall be provided to the Certified Unified Program Agency (CUPA).

WHEREAS, the Planning Commission finds that in fact the requirement for a SPM is also found in Mitigation Measure 3-4, under the Air Quality Chapter of the FEIR, and is required to be verified by the County prior to issuance of building permits.

WHEREAS, the Planning Commission finds that both the OIMP and OMP were reviewed by both the Central Valley Regional Water Quality Control Board Staff and the CalRecycle Local Enforcement Agency (LEA), Keith Janke, as part of Tulare County, Health and

Human Services staff, and to have been found adequate as to form and required for the project as a Finding of Fact as a Project Feature in Exhibit B under the CEQA Resolution;

WHEREAS, OIMP (See Exhibit "E"), OMP (Exhibit "F"), and the SMP (See Exhibit "G"), were further edited and reviewed by opposing council, Chris Campbell, attorney for CDI, to include more local enforceable measures and are hereby incorporated into the FEIR as Mitigation Measures 3-4 and under Mitigation Measures 9-2 through 9-3 of the MMRP and FEIR, and are referred to as Conditions of Approval Numbered 52-54;

WHEREAS, these documents were made and edited and are attached hereto, as locally enforceable measures that satisfies opposing council, as to their form and content under CEQA;

WHEREAS, the comments made at the January 8, 2014 meeting were responded to in the CEQA Resolution as CEQA Exhibit "D" and the Findings of Fact, Exhibit "B" of the CEQA Resolution and are hereby incorporated herein,

WHEREAS, the public hearing was re-opened on January 22, 2014. Staff presented the response to the testimony that was presented at the public hearing on January 8, 2014. In addition, staff presented an alternative site plan to the Commission relocating the site proposed in the Draft EIR for the anaerobic digester. The Alternative Site Plan relocated the anaerobic digester to the JD Heiskell site. The alternative site lay within the area that was analyzed in the CEQA document for the Project; therefore, the alternative site is feasible pursuant to CEQA and does not require any further environmental review.

WHEREAS, the Exhibit "A" Site Plan is feasible under CEQA.

WHEREAS, the applicant has resolved site control over the JD Heiskell site.

WHEREAS, the stormwater retention basin will be relocated, and the collection or conveying of storm water and runoff falls under the County's jurisdiction under its MS4 Permit. All other discharge into this facility shall be in accordance with applicable NPDES permit(s), Wastewater Discharge Requirement and order(s), and other laws and regulations (See attachment Exhibit "A" to Exhibit "B" Findings of Fact.) The Planning Commission further finds that the impacts to the environment will not be significant and are generally exempt for having a less than significant effect on the environment. The County considers this within the ministerial duties of the Public Works Branch to approve stormwater retention basin relocations. Any impacts to aesthetics, water and air, or any other resource, are not materially increased because the alternative site is merely moving the location of the stormwater retention basin's less than significant impact, and because the digesters construction impacts have already been studied and mitigated. Additionally, any impacts to water are not made significant by moving the Project's location and any permits that require Regional Water Quality Control Board Authority are covered under Mitigation Measures 9-1 through 9-3. Given this analysis and the substantial evidence in the record, the Planning Commission finds the relocation of the stormwater retention basin to be less than significant under CEQA.

WHEREAS, the Planning Commission meeting was continued to February 5, 2014, for the parties to come to an agreement, and that an agreement in principle has now been reached.

WHEREAS, the public hearing was re-opened on February 5, 2014. At that meeting of the Planning Commission, Response to Comments from the January 22, 2014 meeting was submitted for the record and Staff presented an update to the Planning Commission, which included a Letter of Intent that provided sufficient site control for entitlement purposes but in the opinion of staff still lacks feasibility for staff's purposes given the duality of the proposed site locations and the lack of a legally sufficient real estate transaction document in the record. Based upon the Letter of Intent, the County is satisfied that the location substantially complies with all applicable plans; and based upon the comments in the hearing, it is concluded reasonably that the project shall locate on the JD Heiskell site, not on the original Project site. The Anaerobic Digester shall be located on APN 295-050-003 (land owned by JD Heiskell located at 11518 Road 120) and the stormwater retention basin will be relocated to APN 295-030-001 (land owned by Calgren located at 11704 Road 120). Lyle Schlyer (representing Calgren) and Christopher Campbell (representing CDI) spoke in favor of the project. Scott Kuney (representing 3R Land) spoke in favor of the location of the digester but raised some concerns about the stormwater retention facility. In further discussion, these concerns will be addressed by the engineer for the Project, and shared with the parties. Any concerns with any basins designed for this Project are addressed in the Findings of Fact, by the Conditions of Approval (including, 55, 59, 75 through 77), and the Mitigation Measures (including, 9-1 through 9-3.)

NOW, THEREFORE, BE IT RESOLVED as follows:

1. The Commission (a) hereby approves the Project and certifies the Final Environmental Impact Report as being in compliance with CEQA and adequate therewith for the reasons set forth herein, (b) certifies that the Commission has reviewed and considered the information contained in the Final Environmental Impact Report (Final EIR) prepared for Special Use Permit No. PSP 10-060/PSR as being in compliance with CEQA, (c) adopts the CEQA findings and mitigation measures, and (d) directs the Environmental Assessment Officer of RMA to execute and file the Notice of Determination with the Tulare County Clerk. The Commission hereby makes additional findings in this resolution in support of its decision, as set forth in the final FEIR.

2. The Planning Commission hereby adopts the Findings of Fact and Mitigation Monitoring Program, as associated with the Pixley Digester Project. The Commission has reviewed and considered the information contained in the Findings of Fact, and Mitigation Monitoring and Reporting Program, in compliance with the California Environmental Quality Act and the State Guidelines for the Implementation of the California Environmental Quality Act of 1970, prior to taking action on the Project.

3. The Commission incorporates by reference the Final EIR, the Staff Reports and Agenda Items prepared by Staff, and such other oral testimony and documentary evidence submitted to the Commission either before or during the public hearings affecting this application, and the Commission further finds and declares that the foregoing recitals (made a part hereof) are true based on substantial evidence in the public record of proceedings.

4. The affected public agencies were duly contacted regarding the Pixley Digester Project.

5. The Commission further finds that the public comment period for the Final Environmental Impact Report was opened and closed on January 8, 2014, and that the public hearing for the Final Environmental Impact Report and special use permit was conducted at a regular meeting of the Commission held on January 8, 2014.

6. The Commission further finds and declares that on January 8, 2014, the Commission duly opened and conducted the public hearing. During said hearing, evidence was submitted by County Staff, the applicant and the general public and said evidence was independently reviewed and considered by the Commission.

7. The Commission also finds and declares that on January 8, 2014, the Commission heard public testimony that was both supportive and in opposition. The commission then closed public comment. Staff's response to comments made on January 8, 2014 is found in Exhibit "D".

8. The Commission certifies and finds, based on substantial evidence, that it has reviewed and considered the information presented in the Final EIR and other relevant evidence to determine compliance with CEQA and the State CEQA Guidelines. The Commission further certifies and finds that prior to taking action on this Project, it independently reviewed and considered the information contained in the Final EIR, and other relevant evidence. Accordingly, based on the Commission's exercise of its independent judgment when reviewing and considering the information in the Final EIR and other relevant evidence presented thereto (including the Staff Reports and Agenda Items made a part hereof). The Commission further certifies and finds that the Final EIR prepared for this Project is adequate and said Final EIR has been prepared and completed in good faith in compliance with CEQA and the State CEQA Guidelines.

9. In adopting this resolution, the Commission is mindful of various judicial standards for EIR adequacy summarized in the State CEQA Guidelines. In particular, the Commission acknowledges State CEQA Guidelines Section 15151, which is set forth as follows:

> An EIR should be prepared with a sufficient degree of analysis to provide a decision maker with information which enables them to make a decision, which intelligently takes account of environmental consequences. An evaluation of the environmental effects of approved project need not be

> exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of a disagreement among the experts. The courts have looked not for perfection, but for adequacy, completeness and a good faith effort at full disclosure.

Similarly, the Commission recognizes, consistent with CEQA Guidelines Section 15003(j) that a court does not pass on the correctness of an EIR's conclusions, but only determines if the EIR is sufficient as an informational document. Thus, the Commission concludes, based on substantial evidence, that the EIR proposed for this Project is consistent with these standards of EIR

10. The Commission, after considering all of the evidence presented and based on substantial evidence, certifies the findings and makes additional findings set forth herein concerning the environmental impacts relating to the project, as described in the Final EIR. These findings of fact are set forth more specifically in attached Exhibit "B" (which is incorporated herein by reference) and in this resolution. These findings, which are based on substantial evidence, are hereby adopted by the Commission. These findings also reflect that changes or alterations that have been required in, or incorporated into, the Project which feasibly mitigate, substantially lessen, or avoid the significant effects on the environment specified in the Final EIR. The findings also discuss the alternatives in detail in finding the Project the superior alternative and that any other location discussed by CDI is impossible or infeasible for the reasons discussed therein.

11. The Commission hereby approves and adopts the Mitigation Monitoring and Reporting Program to monitor the changes or alterations that have been required in, or incorporated into, the Project in order to mitigate feasibly, substantially lessen, or avoid the potentially significant environmental effects, and thus, the Commission hereby commits that the County will enforce said plan, if necessary. The Mitigation Measures and the Mitigation Program and Monitoring Report are set forth in attached Exhibit "C" and in the Final EIR, all of which are incorporated herein by reference.

12. The Commission further finds and declares that (a) adequate written responses have been prepared to the comments submitted by various public entities and interested parties during the public hearings held for this matter by the Commission; (b) on December 26, a copy of the written responses to the comments to the Draft EIR was duly and timely sent to affected public agencies and interested parties; (c) said responses were received by public agencies at least 10 days before the action taken on the Final EIR and Special Use Permits; and (d) the County responded to in good faith and in writing to these comments, as well as to the comments received after November 25, 2013. After due consideration of these written responses, the Commission finds that said responses prepared by Staff are adequate and supported by substantial evidence in the public record of proceedings, and accordingly, said responses are hereby accepted.

13. Accordingly, the Commission, after considering all of the evidence presented and based on substantial evidence in the public record of proceedings, certifies that the information contained in the Final EIR for the Project provides an adequate assessment of the potentially significant impacts allowed by the Project; and hereby approves the Final EIR for the Project as described and delineated in said EIR, and hereby certifies that said Final EIR is in compliance with CEQA and the State CEQA Guidelines; and in connection therewith, the Commission on behalf of the County hereby adopts, approves and intends to implement, monitor and enforce (if necessary) all mitigation measures set forth in the Final EIR as conditions of approval of the subject Project.

14. The Final EIR for the Project is hereby certified for approval in conjunction with Findings of Fact, and Mitigation Monitoring and Reporting Program, all of which are hereby incorporated in this Resolution by reference and adopted.

15. The Commission certifies and finds that prior to taking action on the Project, it independently reviewed and considered the information contained in the Final Environmental Impact Report and Mitigation Monitoring and Reporting Program, and other relevant evidence presented thereto (including the Staff Report made a part hereof).

16. Based on information set forth in the EIR and Findings of Fact (Exhibit "B") and Mitigation Monitoring and Reporting Program (Exhibit "C") and Response to Planning Commission Hearing Comments (Exhibit "D"), the Project will not have a significant effect on the environment.

17. The Commission Conditionally hereby approves Special Use Permit No. PSP 10-060, including Resolution No. 8927 establishing findings and conditions.

18. The Commission directs that Staff prepares, execute and file a Notice of Determination (NOD) in accordance with the State CEQA Guidelines, provided, and, that the owners and operators shall pay the required fees / costs associated with the filing of the NOD and the recording of the acceptance of conditions and this resolution.

19. The Commission confirms that the documents and other materials that constitute the public record of proceedings (which supports the Commission's decision made herein) are located at the Tulare County Resource Management Agency at 5961 South Mooney Boulevard, Visalia, California 93277 (Telephone No. (559) 624-7000). The custodian for these documents and other materials is Mr. Hector Guerra, Chief Environmental Planner, Environmental Planning Division, Tulare County Resource Management Agency.

The foregoing resolution was adopted upon motion of Commissioner Millies, seconded by Commissioner Aguilar, at a regular meeting of the Commission on February 5, 2014, by the following roll call vote:

AYES: Millies, Gong, Elliott, Dias, Norman, Aguilar

NOES: None

ABSTAIN: None

ABSENT: Pitigliano, Whitlatch

Tulare County Planning Commission

Michael C. Spata, Secretary

Source: Maas Energy Works, Inc.