Lakeside-02

Appendix A Supporting the Prepared Direct Testimony of Daryl Maas

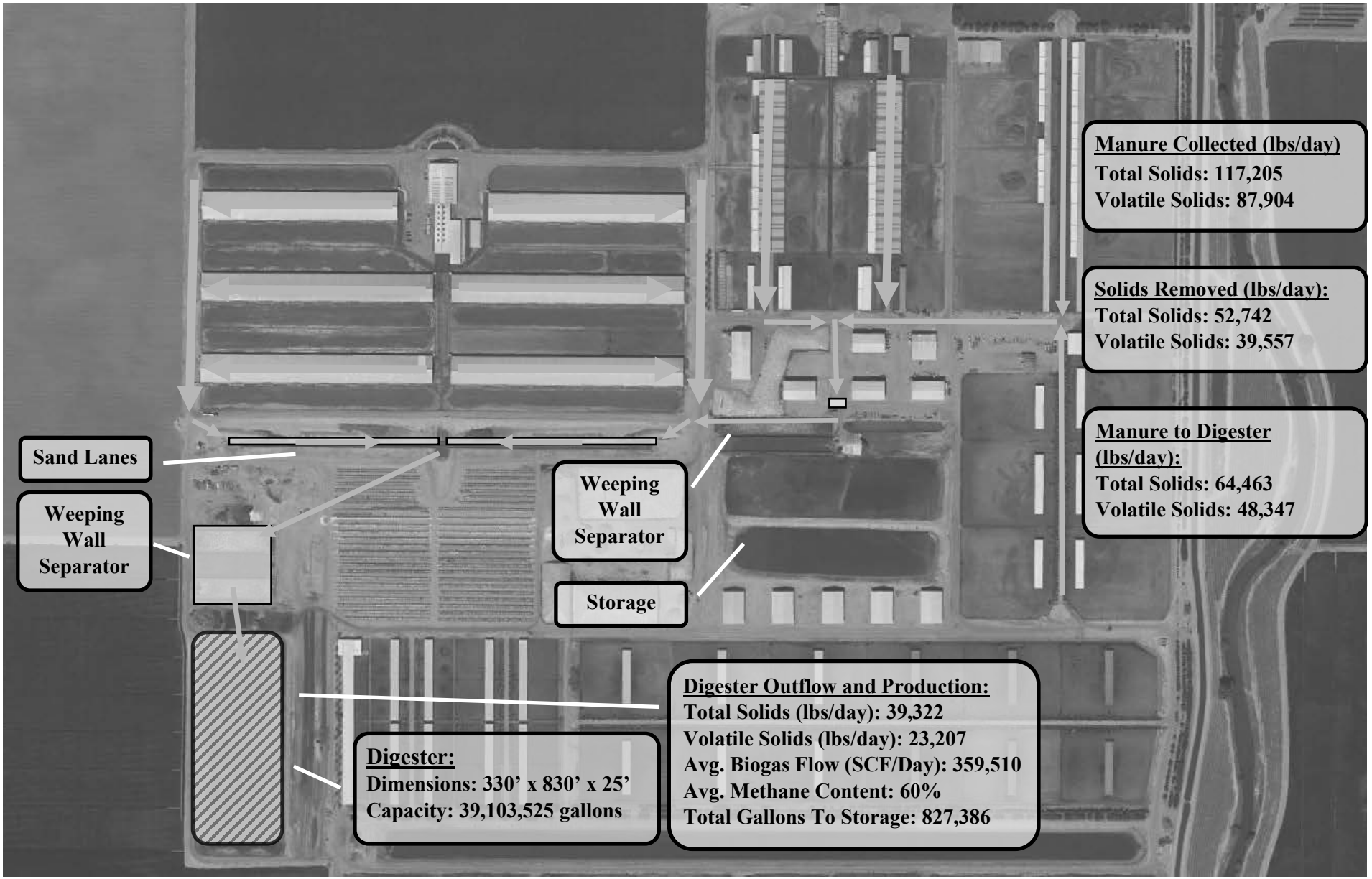
(Pilot Project)

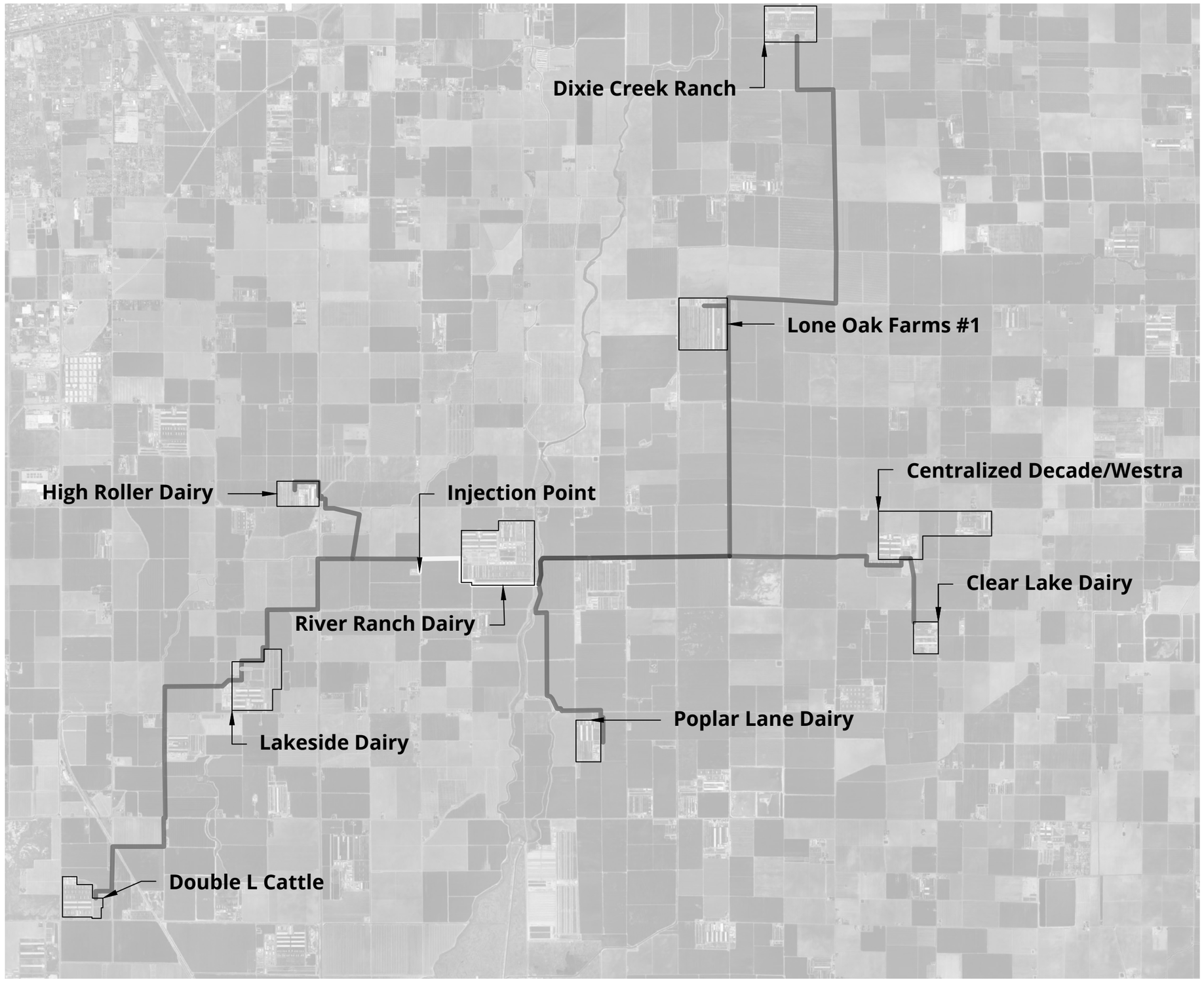
[PUBLIC VERSION VOLUME 3]

Lakeside Pipeline Dairy Digester Cluster

River Ranch Dairy - Digester 9

Mass Balance Diagram (post-project)





General Notes

Attachment 4

Materials: 10" HDPE, SDR 21
Pressure: 9 PSI
Temp: 70 F to 110 F

Materials: 8" HDPE, SDR 21
Pressure:10 PSI
Temp: 70 F to 110 F

Materials: 6" HDPE, SDR 21
Pressure:11 PSI
Temp: 70 F to 110 F

Materials: 4" HDPE, SDR 21
Pressure: 13 PSI
Temp: 70 F to 110 F

MAAS ENERGY WORKS

Firm Address
3711 Meadowview Dr.
Redding, CA, 96002

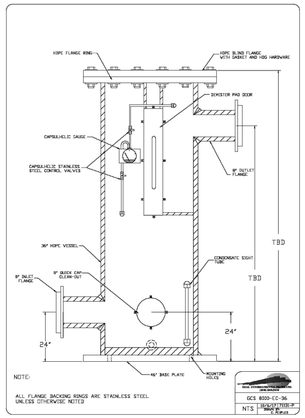
Project Name and Address
Lakeside Pipeline Project

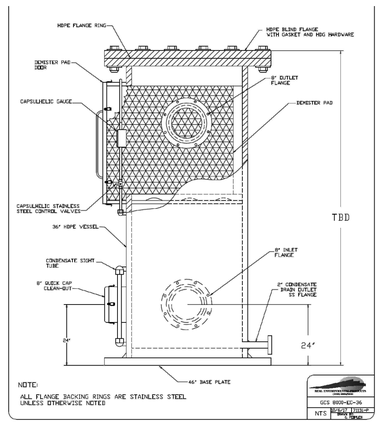
Date
6/8/18

Version
2.7

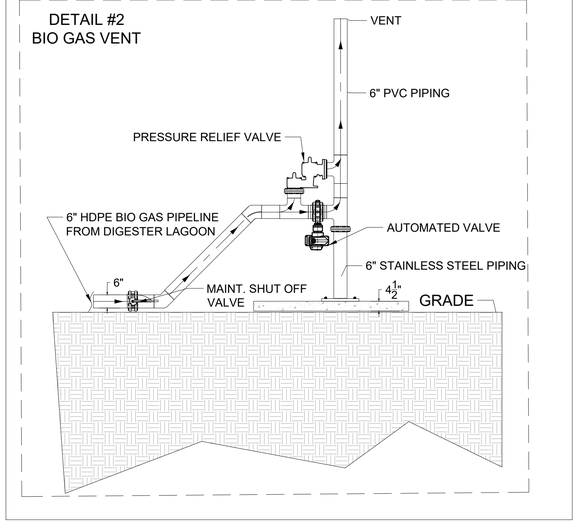
Drawn By
Hudson Davis

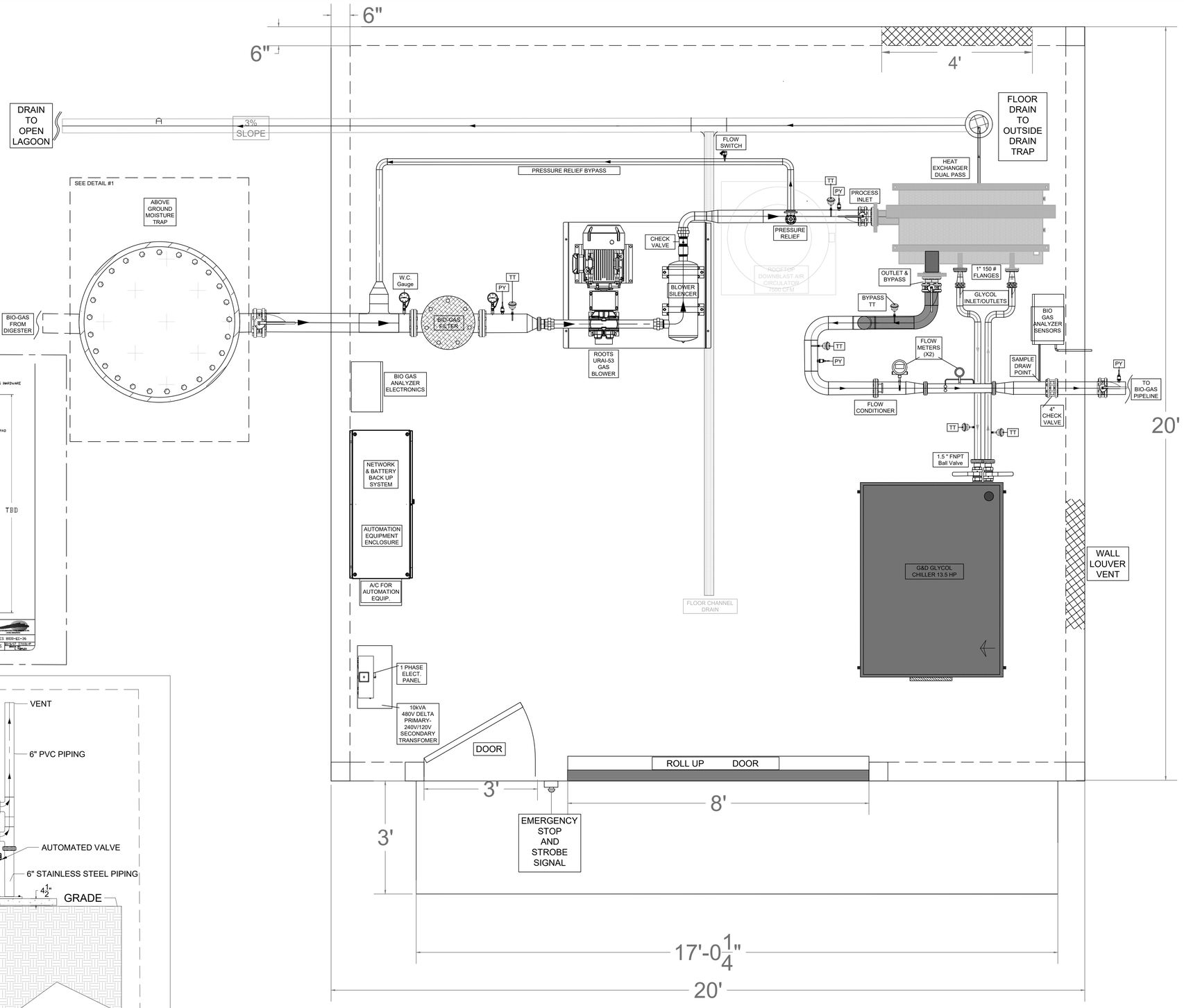
DETAIL #1
MOISTURE TRAP





DETAIL #2
BIO GAS VENT





General Notes

NOTES
1. BUILDING AIR EXCHANGE RATE TO MATCH CHILLER OF 7500 CFM
2. PIPING 316 STAINLESS STEEL SCHEDULE 10 UNLESS OTHERWISE NOTED

No.	Revision/Issue	Date
		1/1/2018

Drawing Name

ELECTRIC INNOVATIONS INC.
1670 Market St. STE 256
REDDING, CA 96001
(530) 222-3366

Project Name and Address

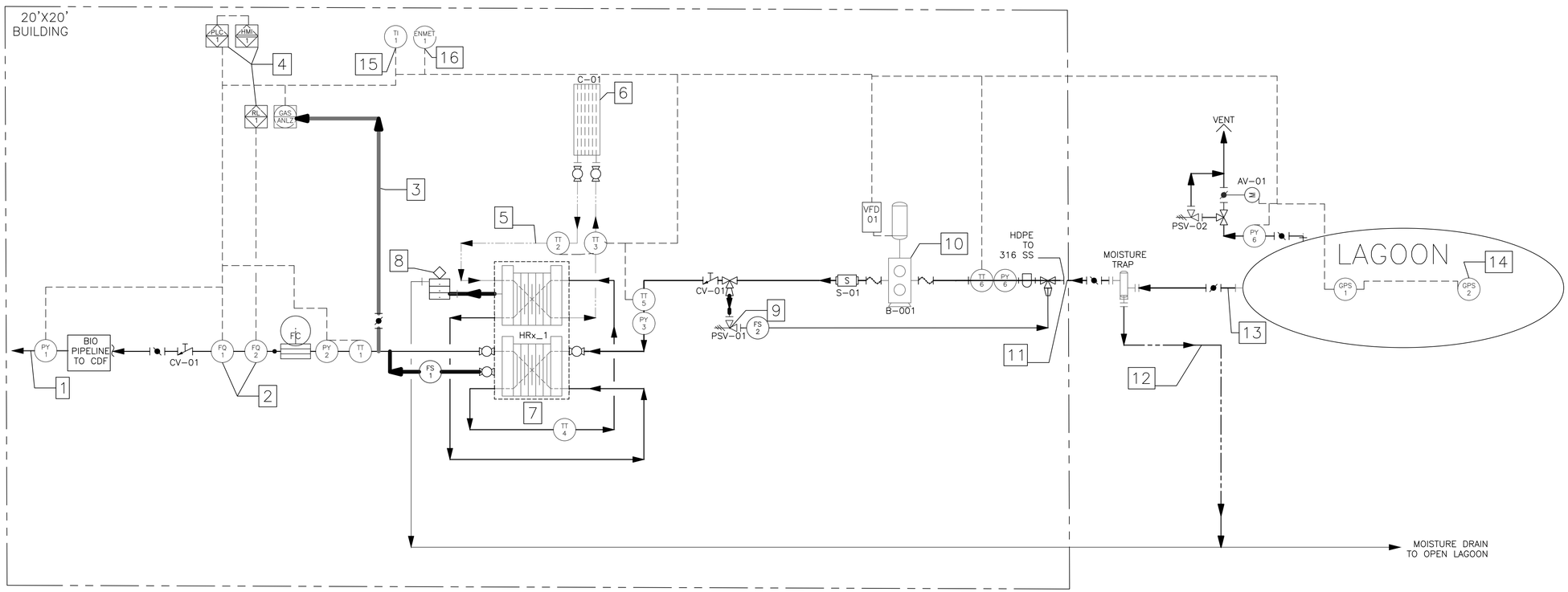
Preliminary California Design

Area

Stamp

Drawing Number
M-1

Author
A. ANGELI



Equipment List

Item	Tag	Manufacturer	Model Number
HEAT EXCHANGER	Hrx 1, 2	XCHANGER	BG-125
GAS BLOWER	B-001	ROOTS	45URAI
VFD (GAS BLOWER)	VFD 01	AUTOMATION DIRECT	GS 2
BOWER SILENCER	S-01	MIRATECH	ISEEOZ-25MN-4-17060098
FLOW CONDITIONER	FC 01	TBD	TBD
GLYCOL CHILLER	C-01	G&D	GD-7H
CHECK VALVES	CV-02, CV-02	US VALVE	19-0-0-SL-E-4
PRESSURE RELIEF	PSV-01	KUNKLE VALVE	912BJHM
PRESSURE RELIEF	PSV-02	GROTH	1720A
AUTOMATED VALVE	AV-01	TBD	TBD

Instrumentation List

Item	Tag	Manufacturer	Model Number
PLC	PLC-1	AUTOMATION DIRECT	PRODUCTIVITY 2000
HMI	HMI-1	AUTOMATION DIRECT	C-MORE
DATA LOGGER	RL-1	RED LION	DSPGT001
GAS DETECTION	ENMET-1	ENMET	04640-001
FLOW METER	1-FQ-1	SAGE PRIME	SIP-05-06-DC24-DIG
FLOW METER 2	1-FQ-2	ENDRESS+HAUSSER	PRO SONIC FLOW B
GAS ANALYZER	GAS -ANLZ	ELECTRIC	PRDTR
PRESSURE TRANSDUCER	PY-1 / PY-6	OMEGA	PX309-015CGI
THERMOSTAT	TI-1	OMEGA	EWS-RH
THERMOCOUPLE	TT-1 / TT-6	OMEGA	PR-21SL-3-100-A-0400-M12-1
TC TRANMITTER	TT-1 / TT-6	OMEGA	TX-M12-RTD-C-1
THERMOWELL	TT-1 / TT-6	OMEGA	1/2-260S-U21/2-304SS
FLOW SWITCH	FS1-FS2	IFM	SI0508

MECHANICAL LEGEND

- PRIMARY LINE
- SECONDARY LINE
- ELECTRIC SIGNAL
- BUTTERFLY VALVE
- STOP CHECK VALVE
- BALL VALVE
- PRESSURE RELIEF VALVE
- BIO-GAS FILTER
- AUTOMATED CONTROL VALVE
- CARTRIDGE AIR FILTER
- FLEX COUPLING
- BLOWER SILENCER

INSTRUMENT LEGEND

- PLC: PROGRAMMABLE LOGIC CONTROLLER
- HMI: HUMAN MACHINE INTERFACE
- RL: DATA LOGGER
- GAS ANLZ: BIO-GAS ANALYZER (H2S, 02, & CH4)
- FQ: FLOW METER
- FS: FLOW SWITCH
- RH: RELATIVE HUMIDITY
- TT: TEMPRATURE TRANSMITTER
- PY: PRESSURE TRANDUCER
- GPS: GPS UNIT
- LT: LEVEL TRANSMITTER

General Notes

1. 4" HDPE SDR17 PIPELINE TO CALGREN
2. FLOWMETERS (X2, 1 REDUNDANT)
3. 1/2" 316 SS WALL SAMPLE TUBING
4. PRIMARY PLC, REDUNDANT DATA LOGGER, & HMI INTERFACE. COMMS TO CALGREN VIA WIRELESS WLAN
5. 2" 316 SS 0.083" WALL, INSULATED CHILLER FEED/RETURN GLYCOL LINE.
6. CHILLER UNIT FOR GLYCOL RATED AT 7 TONS
7. HEAT EXCHANGE UNIT XCHANGER BG-125
8. DRIP TRAP FROM HEAT EXCHANGE UNITS
9. 4" 316 SS 0.083" WALL BYPASS RELIEF
10. POSITIVE DISPLACEMENT BLOWER. 200 SCFM @ 6 PSI BACKPRESSURE
11. 6" HDPE SDR 17 TO 4" SS 316 0.083" WALL
12. 3" HDPE SDR 17 MOISTURE DRAIN LINE
13. 6" HDPE SDR 17 BIO GAS LINE FROM DIGESTER
14. GPS UNITS (X2) ON DIGESTER COVER TO MONITOR LEVEL
15. BUILDING THERMOSTAT
16. ENMET GAS DETECTION SYSTEM

No.	Revision/Issue	Date
	9/21/2017	

Drawing Name
CIRCLE A DAIRY P&ID

ELECTRIC INNOVATIONS INC.
1670 Market St. STE 256
REDDING, CA 96001
(530) 222-3366

Project Name and Address
CIRCLE A DAIRY
PIXLEY, CA

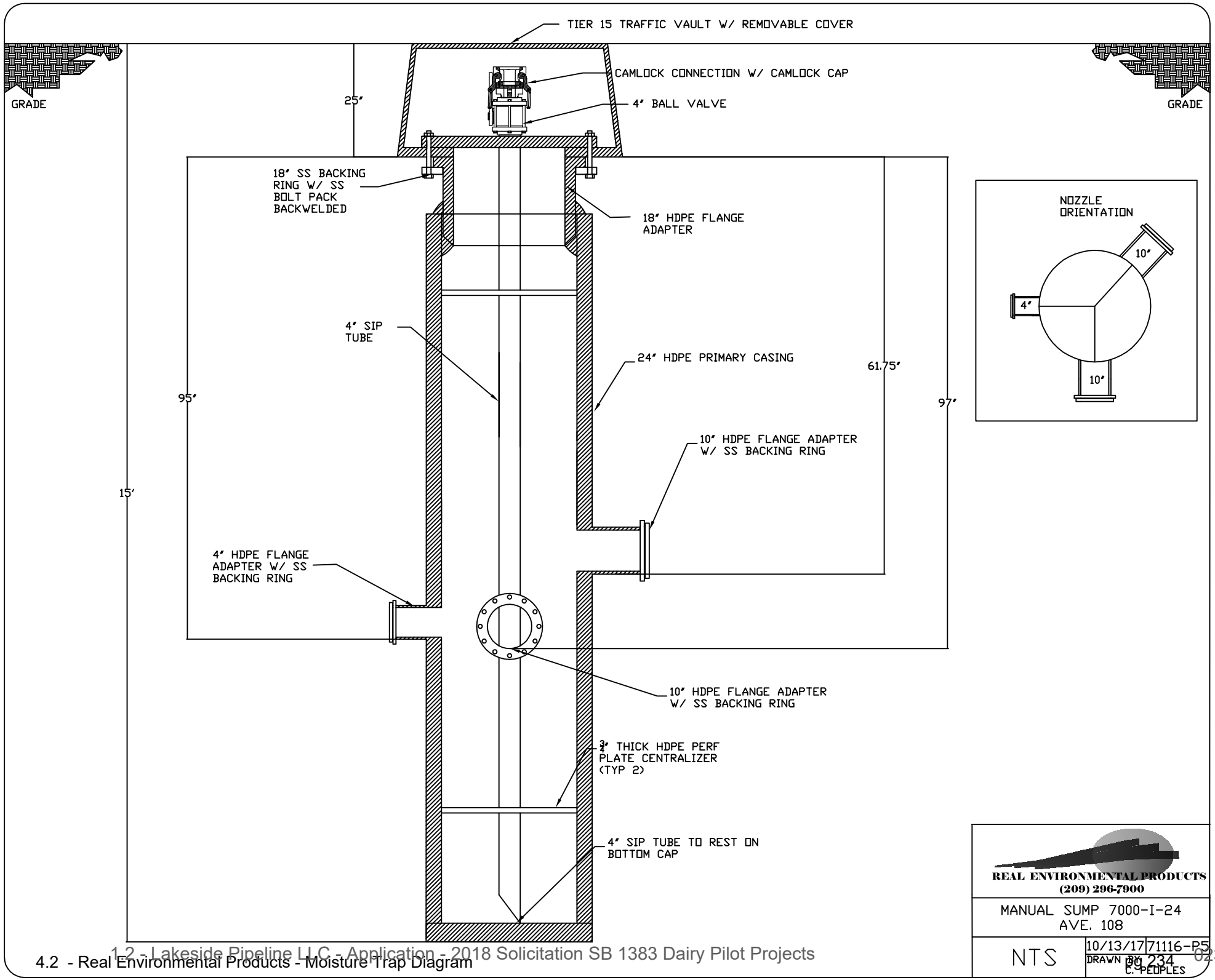
Area

Stamp

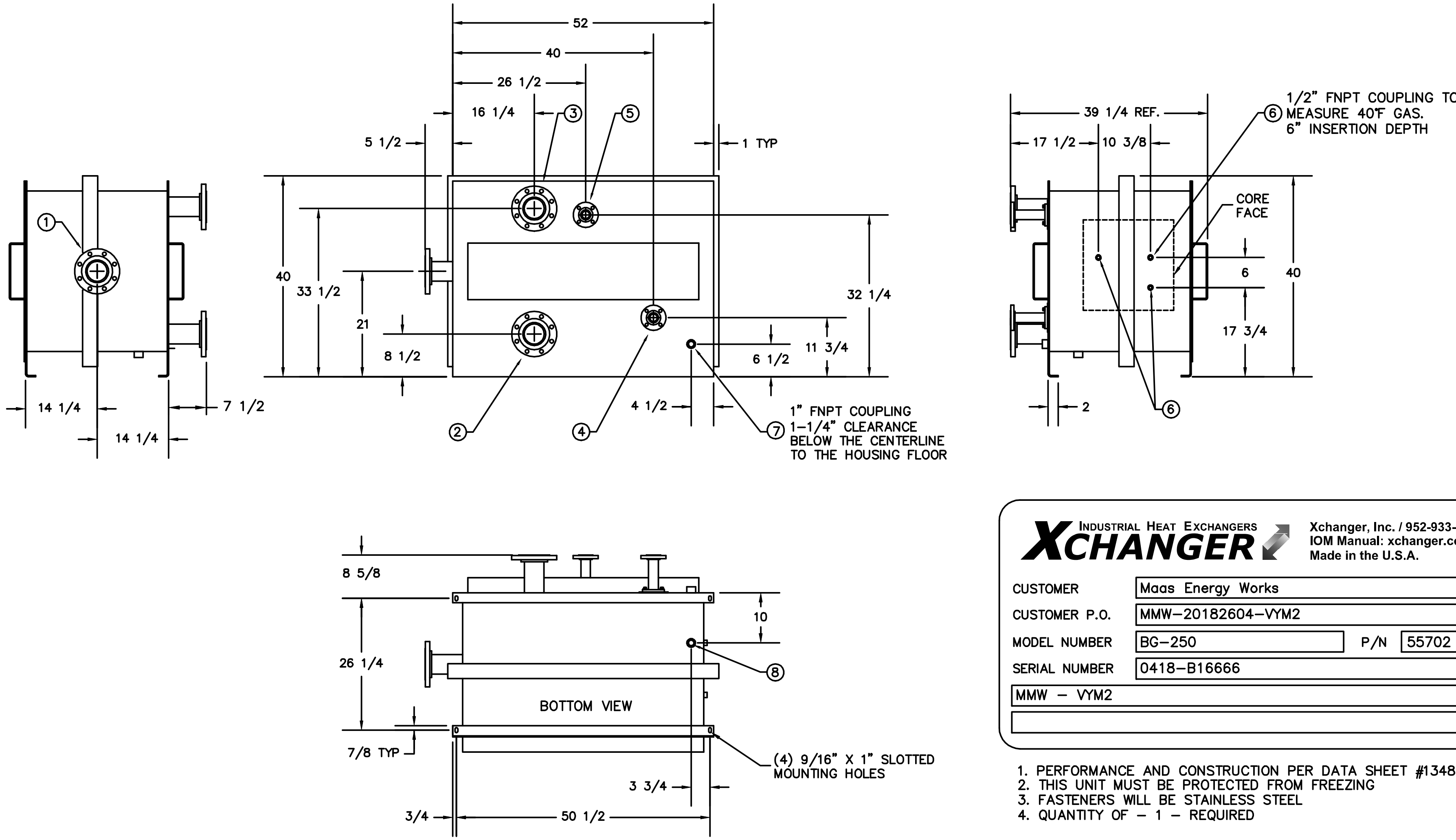
Drawing Number
P&ID

Author
A. Angeli

C:\Users\ted\Dropbox\Electric Innovations Team Folder\EI INC Operations\CALGREN DAIRY FUELS LLC\ACAD\PnID\PID DWG\7_13_PID_CIRCLE_A.dwg


TIER 15 TRAFFIC VAULT W/ REMOVABLE COVER
GRADE
GRADE
25'
CAMLOCK CONNECTION W/ CAMLOCK CAP
4" BALL VALVE
18" SS BACKING RING W/ SS BOLT PACK BACKWELDED
18" HDPE FLANGE ADAPTER
4" SIP TUBE
24" HDPE PRIMARY CASING
61.75"
95'
97"
10" HDPE FLANGE ADAPTER W/ SS BACKING RING
15'
4" HDPE FLANGE ADAPTER W/ SS BACKING RING
10" HDPE FLANGE ADAPTER W/ SS BACKING RING
3/4" THICK HDPE PERF PLATE CENTRALIZER (TYP 2)
4" SIP TUBE TO REST ON BOTTOM CAP
NOZZLE ORIENTATION
10"
4"
10"
REAL ENVIRONMENTAL PRODUCTS
(209) 296-7900
MANUAL SUMP 7000-I-24
AVE. 108
NTS
10/13/17
71116-P5
DRAWN BY C. PEOPLES

CERTIFIED DRAWING
Date: 04/30/18



XCHANGER Industrial Heat Exchangers
Xchanger, Inc. / 952-933-2559
IOM Manual: xchanger.com
Made in the U.S.A.

CUSTOMER	Maas Energy Works		
CUSTOMER P.O.	MMW-20182604-VYM2		
MODEL NUMBER	BG-250	P/N	55702
SERIAL NUMBER	0418-B16666		
MMW - VYM2			

1. PERFORMANCE AND CONSTRUCTION PER DATA SHEET #134814A
2. THIS UNIT MUST BE PROTECTED FROM FREEZING
3. FASTENERS WILL BE STAINLESS STEEL
4. QUANTITY OF - 1 - REQUIRED

NOZZLE SCHEDULE

ITEM	CONNECTION	DESCRIPTION	QTY
1	PROCESS INLET	4" 150# ANSI R.F.F	1
2	PROCESS REHEAT OUTLET	4" 150# ANSI R.F.F	1
3	PROCESS BYPASS OUTLET	4" 150# ANSI R.F.F	1
4	SERVICE INLET	1 1/2" 150# ANSI R.F.F	1
5	SERVICE OUTLET	1 1/2" 150# ANSI R.F.F	1
6	INSTRUMENT COUPLING	1/2" FNPT COUPLING	3
7	LEVEL SWITCH TEST PORT	[illegible] FNPT COUPLING	1
8	HOUSING DRAIN	1" FNPT COUPLING	1

DESIGN CONDITIONS

	PROCESS	SERVICE	UNITS
DESIGN PRES.	5	100	PSIG
DESIGN TEMP.	300	200	°F
INLET PRES.	17.594	.	PSIA
INLET TEMP.	165	33	°F
BYPASS TEMP.	38		
OUTLET TEMP.	128.8	41.7	°F
MIXED TEMP.	90		

TOLERANCES (UNLESS OTHERWISE NOTED)	XCHANGER Industrial Heat Exchangers — 1401 SOUTH 7TH ST HOPKINS, MN 55343			
DECIMAL ± .25	MODEL BG-250 HEAT EXCHANGER ASSEMBLY			
FRACTIONAL ± 1/4	DRAWN BY: MHA ENGINEER: GBF		JOB NUMBER B16666	
ANGULAR ±	SCALE: NONE DATE: 04/30/18	SHEET 1 OF 1	DRAWING NUMBER 55702	REV. B

Engineer: Gregg Fayer December 5, 2017

Prepared for:

Maas Energy Works

Geovany Osorio

PERFORMANCE	**PROCESS MEDIA SIDE**	**SERVICE MEDIA SIDE**
Fluid Circulated	Biogas (60% CH4, 40% CO2)	Ethylene Glycol 50%
Volumetric Flow Rate	325.0 Std. ft^3/min	40.0 gal/min
Total Fluid Entering	1,319.4 lb/hr	21,655.8 lb/hr
Liquid		21,655.8 lb/hr
Water Vapor	108.4 lb/hr	
Non-Condensibles	1,211.0 lb/hr	
Vaporized or (Cond.)	(103.2 lb/hr)	
Temperature In	165.0 °F	33.0 °F
Temperature Out (Bypass)	38.0 °F | 42% Flow	
Temperature Out (Reheat)	128.8 °F | 58% Flow	
Temperature Out (Average)	90.0 °F | 16% RH	41.7 °F
Inlet Pressure (Absolute)	17.594 lb/in^2	
Velocity (Standard)	144.4 ft/min	4.0 ft/sec
Pressure Loss	0.11 lb/in^2	11.1 lb/in^2
Fouling Factor	0.00010 ft^2-°F-hr/BTU	0.00100 ft^2-°F-hr/BTU

Service Media Heat Load: 145,113 BTU/hr (105,940 BTU/hr Latent)

AVERAGE MEDIA PROPERTIES		
Thermal Conductivity	0.016 BTU/hr-ft-°F	0.212 BTU/hr-ft-°F
Specific Heat	0.336 BTU/lb-°F	0.768 BTU/lb-°F
Absolute Viscosity	0.033 lb/ft-hr	17.373 lb/ft-hr
Density (MW)	(26.1)	67.503 lb/ft^3
Latent Heat of Vapor	1,064.9 BTU/lb	

CONSTRUCTION		
Design Temperature	300 °F	200 °F
Design Pressure (Gauge)	5.0 lb/in^2	100.0 lb/in^2
Test Pressure (Gauge)	7.5 lb/in^2	300.0 lb/in^2
Test Procedure	Bubble Test	Bubble Test
ASME Code Stamp	Not Applicable	Not Applicable

Tube Material : 304L Stainless Steel	Housing Material : 304 Stainless Steel
Fin Material : Aluminum	Casing Material : 304L Stainless Steel
Sealant Material : Teflon	Phenolic Coating : None
Removable Core : Yes, Rear Only	Mist Eliminator : None
Tube Circuit Type: Nontrapped	Gas Flow Dir. : Right Hand Horizontal
Plate-Fin Core : Aluminum	Weight (Dry/Wet) : 386 / 413 lb
Thermometers : None	Mod. Water Valve : None
Diff. Pres. Gauge: None	Auto. Drain Trap : None

CONNECTIONS

Process Inlet : 4" ANSI 150 lb RFF

Bypass Outlet : 4" ANSI 150 lb RFF

Reheat Outlet : 4" ANSI 150 lb RFF

Service Inlet : 1.5" S.S. ANSI 150 lb RFF

Service Outlet : 1.5" S.S. ANSI 150 lb RFF

NOTES

Approximate unit dimensions (inches): A = 42, B = 46, C = 42

Construction material suitability must be determined by customer.

It is unlikely that condensate will carry-over in process stream.

Vilter

EMERSON

QUOTE

Created by GOGGINSS
Phone
Fax
Email shawn.goggins@emerson.com
Cell 414-403-3752

Sales Rep. Shawn Goggins
5555 South Packard Ave

Quote # VLTQ14678-02
Date 06/18/18
Doc Name GC-MAAS Energy Project

Quote To: SCS

Jeff Pierce

Qty	Description	Ext. Price

>>>>>>>>>>> PACKAGE #1 BLOWER EQUIPMENT <<<<<<<<<<<<<<<<

1 Qty 1 50% Blower Model LS10: Centrifugal with Cast iron housing, aluminum impellers, Gastight blower construction,Casing drains, phenolic coating of internal cast iron parts. Set up and piped for future blower
Qty 1 Fabricated steel baseplate under all equipment, no skid split. Skid is set up for 2 blowers, Painting-Standard
Qty 1 Drive: Direct Couple Rexnord Omega spacer type, Standard drive guard

Qty 1 75 HP TEFC motor; Severe Duty, High Efficiency, 3600 RPM, 3/60/460, 1.15 S.F. suitable for operation in Class I, Grp. C&D, Div. 2 area, inverter duty rated, with bearing and winding RTDs, space heater and oversized j box rated for 50C ambient, insulated bearings
Qty 1 Suction and Discharge pressure and temp. local indicators, discharge pressure transmitter, common suction pressure transmitter, discharge temperature RTDs.
Qty 1 Inlet and Discharge Stainless Steel bellows expansion joints
Qty 1 Suction and discharge butterfly valves, discharge check valve & CS Body with SS trim Recycle Valve
Qty 1 < Unit mounted NEMA 4 steel control enclosure with the following: AC Panel Cooler
- Allen Bradley CompactLogix 1769-L33ER with 2 MB Memory
- Panel View Plus 1500 HMI/graphic Anti-Glare Display with Sun Shade
- ANSI 12.12.01 UL Listed and Labeled for Class I, Div 2, Group C & D
- Designed for indoor/outdoor service (-3 Deg. F to 130 Deg. F)
Qty 1 Suction 12" 304SS header and discharge 10" 304SS header

1 @@@@ Inlet Scrubber Scrubber - Mounted & Wired on Blower Base @@@@
Digester Vane/ Mesh 304SS Separator. 30" dia. x 96" seam to seam
lower section vertical Plate-Pak Vane / Flow Distributor:
Style: V-V-38, Material: 304SS , Const.: 3 Piece Construction, removable segmented mesh pads
ASME Code Vessel rated for 100 psig, 250F, flowing 2750 SCFM Digester gas at 97F, 0 psig

14" inlet and outlet nozzles 150#
(2) 2" level switch flanges
(2) 1" level gauge connection couplings
(1) 2"drain coupling- side

1 Scrubber accessories to include the following items:
> Level gauge with isolation valves
> Five (5) ultrasonic level switches
> ASME certified safety relief valve - SS Body & Trim (Shipped Loose)
> Condensate Line Strainer
> Centrifugal type condensate pump with mechanical seal, TEFC, Class I, Div 2, Group D, Three Phase Motor
> Service and check valves for condensate pump with outlet NC Solenoid Valve.
> Two (2) Pressure Transducers for Pressure Drop Measurement

Qty	Description	Ext. Price
1	@@@@ Outlet Scrubber Scrubber - Mounted & Wired on Blower Base @@@@ H2S Inlet Vane 304SS Separator. 30" dia. x 96" seam to seam lower section vertical Plate-Pak Vane / Flow Distributor: Style: V-V-38, Material: 304SS , Const.: 3 Piece Construction ASME Code Vessel rated for 100 psig, 250F, flowing 2750 SCFM Digester gas at 115F, 7.5 psig 12" inlet and outlet nozzles 150# (2) 2" level switch flanges (2) 1" level gauge connection couplings (1) 2"drain coupling- side	
1	Scrubber accessories to include the following items: > Level gauge with isolation valves > Five (5) ultrasonic level switches > ASME certified safety relief valve - SS Body & Trim (Shipped Loose) > Condensate Line Strainer > Centrifugal type condensate pump with mechanical seal, TEFC, Class I, Div 2, Group D, Three Phase Motor > Service and check valves for condensate pump with outlet NC Solenoid Valve. > Two (2) Pressure Transducers for Pressure Drop Measurement	
1	For outdoor high ambient 2200btu, 120vac, Class I, Div 2, Air conditioner, NEMA 4 ANSI Gray 61 - Cost per compressor	
1	##### Blower After Cooler, with TEFC motor(s), shipped loose ####### < Unit will include : (1) Fan w/ 10 hp Class 1 Div 2 ATL Motors < Unit will be a 1 Circuit Cooler for up to 2 Blowers : Unit Coil & SS Cleanable Header with SS Coil Construction < Air Cooled After Cooler 1 circuit based on 100 deg Ambient : 4000 feet Elevation < A) 2,750 SCFM of Saturated LFG entering at 173 and leaving at 115 deg F. < Outlet RTD, Purge and Drain Valves Mounted	
	Package 1 Blower SubTotal	$448,597
	>>>>>>>>>>>> PACKAGE #2 DUAL CIRCUIT & NRU HX CHILLING SKID <<<<<<<<<<<<<<<<<	
1	@@@@ LP Chiller Outlet Scrubber - Mounted & Wired on Chiller Base @@@@ LP Chiller Outlet Vane 304SS Separator. 30" dia. x 96" seam to seam lower section vertical Plate-Pak Vane / Flow Distributor: Style: V-V-38, Material: 304SS , Const.: 3 Piece Construction ASME Code Vessel rated for 100 psig, 250F, flowing 2750 SCFM Digester gas at 40F, 6 psig 12" inlet and outlet nozzles 150# (2) 2" level switch flanges (2) 1" level gauge connection couplings (1) 2"drain coupling- side	
1	Scrubber accessories to include the following items: > Level gauge with isolation valves > Five (5) ultrasonic level switches > ASME certified safety relief valve - SS Body & Trim (Shipped Loose) > Condensate Line Strainer > Centrifugal type condensate pump with mechanical seal, TEFC, Class I, Div 2, Group D, Three Phase Motor > Service and check valves for condensate pump with outlet NC Solenoid Valve. > Two (2) Pressure Transducers for Pressure Drop Measurement	

Qty	Description	Ext. Price
1	@@@@ HP Chiller Outlet Scrubber - Mounted & Wired on Chiller Base @@@@ HP Chiller Outlet Vane/ Coalescer 304SS Separator. 24" dia. x 96" seam to seam lower section vertical Plate-Pak Vane / Flow Distributor: Style: V-V-38, Material: 304SS , Const.: 3 Piece Construction ASME Code Vessel rated for 300 psig, 250F, flowing 4152 SCFM Digester gas at 40F, 200 psig With coalescing filter elements to .001ppm max. oil carryover. 4" inlet and outlet nozzles 300# (2) 2" level switch flanges (2) 1" level gauge connection couplings (1) 2"drain coupling- side Full opening manway with davit arm Spare elements	
1	Scrubber accessories to include the following items : > Level gauge with isolation valves > Five (5) ultrasonic level switches > ASME certified safety relief valve - CS Body & SS Trim with Lockable Inlet Valve > Condensate Line Strainer > Condensate solenoid valve suitable for Class I, Division 2, Group D area > Service valves for condensate solenoid valve > Low level solenoid valve suitable for Class I, Division 2, Group D area > Two (2) Pressure Transducers for Pressure Drop Measurement	
1	Flooded R134A 20"x 210" (2) Circuit LP & HP Shell & Tube Chiller - SS on Material on the tube side. Shell Side & Tube side designed for 300 psi. Mounted 24" x 11' Surge Drum. SS LP Circuit > Cool wet 2750 SCFM from 115 Deg down to 40 Deg HP Circuit > Cool wet 4152 SCFM from 115 Deg down to 43 Deg 106 tons of Refrigeration	
1	4 (100MM) PRESSURE REGULATOR, 4SW, RANGE A(0-150psig), WO/STR	
1	4 REFRIGERANT SHUT-OFF VALVE ANGLE, WELDED, SEAL CAP	
2	6 REFRIGERANT SHUT-OFF VALVE GLOBE, WELDED, SEAL CAP, RFF	
2	1-1/4SHUT-OFF VALVE,ANGLE EXT.NECK,BOLTED BONNET, THD.,SC	
5	3/4SHUT-OFF VALVE,ANGLE EXT.NECK,BOLTED BONNET,SW.,SC	
3	2 REFRIGERANT SHUT-OFF VALVE GLOBE, SOCKET WELD, SEAL CAP	
1	OPTION 'O' FOR OUTLET PRESSURE REGULATOR FEATURE, RANGE B (30 to 300PSI)	
1	2 (50MM) PRESSURE REGULATOR, 2SW, RANGE B(30-300psig), WO/STR	
1	DUAL PRESSURE RELIEF VALVE KIT 1X1-1/4,R134A,SET 350 PSI	
1	2(50MM) PISTON CHECK VALVE W/WN FLGS	
1	2 REFRIGERANT STRAINER W/1-1/2 SW FLANGES, 60 MESH W/DRAIN PLUG	
2	Fisher Feed Valve	
1	VRU - Venturi oil recovery valves for Halocarbon Systems with HX	
1	Level column	
1	RTD's	
3	Temperature Pressure & Temperature Gauges	

Qty	Description	Ext. Price
	@@@@@@@@@ R134A Refrigeration Compressor @@@@@@@@@@	
1	Vilter Model VSMC-501-A-HN-E-16-N-LL-R-S-3 Additional features include: < Single rotor screw compressor with Parallex capacity and variable volume slide valves < Close coupled C-Flange Motor & Drive Coupling with guard < 3" suction line stop valve with suction strainer and separate check valve < 30" Oil Separator, built to ASME code, with two oil level sight glasses, oil heater and oil drain valve < Large capacity oil filter with isolation valves < Motorized liquid injection control valve with strainer, sight glass, solenoid and isolation valves < Unit mounted NEMA 4 steel control enclosure with the following: - Allen Bradley CompactLogix 1769-L33ER with 2 MB Memory - Panel View Plus 1500 HMI/graphic Anti-Glare Display with Sun Shade - ANSI 12.12.01 UL Listed and Labeled for Class I, Div 2, Group C & D - Designed for indoor/outdoor service (30 Deg. F to 130 Deg. F) < Unit wiring run inside 3/4" minimum Rigid Metal Conduit or Approved Cables. < Unit primed and painted per Vilter Standard T00480 indoor/outdoor normal degree of protection against corrosion	
1	DUAL OIL FILTERS	
1	Synthetic Oil -type B68 for 24" oil sep	
1	30" Oversized Oil Separator versus 20" standard for VSM501	
1	250 Hp Motor, 3600 Rpm, 460v/3/60, TEFC, Class 1 Div II w/ Heaters & RTDs - 1.15 SF - Bearing RTD's - 50 C Rated	
	@@@@@@@@@@@ AIR COOLED CONDENSER @@@@@@@@@@@	
1	Air Cooled Condenser with TEFC motor(s) - Carbon Steel Construction - Coil & Header. Unit will include : (2) Fans w/ 20 hp Class 1 Div 2 Motors - VFD - Wiring by others Condenser Stop Valves to be shipped Loosed and piped in the field by others. Based on 100 Deg Ambient, 4000 Feet Elevation - Purge & Drain Valves Mounted - Relief shipped loose Extra Warranty	
2	4 REFRIGERANT SHUT-OFF VALVE ANGLE, WELDED, SEAL CAP	
5	3/4SHUT-OFF VALVE,ANGLE EXT.NECK,BOLTED BONNET,SW.,SC	
1	DUAL PRESSURE RELIEF VALVE KIT 1X1-1/4,R134A,SET 350 PSI	
	@@@@@@@@@@@ HPR @@@@@@@@@@@	
1	Horizontal Liquid Receiver, 24 Dia x 18' Long, 300psi ASME design with the following connections for: 4" liquid inlet & 2" outlet, 1" relief valve, 1" purge, 3/4" drain, 1-1/4" gage glass, and 2" equalizing. Prime paint only, and stands included. - 24 month operating warranty on Vessel Only	
1	1-1/4SHUT-OFF VALVE,ANGLE EXT.NECK,BOLTED BONNET, THD.,SC	
1	3/4SHUT-OFF VALVE,ANGLE EXT.NECK,BOLTED BONNET,SW.,SC	
1	1 SHUT-OFF VALVE, GLOBE EXT.NECK,BOLTED BONNET,THD,HW	
1	2 REFRIGERANT SHUT-OFF VALVE GLOBE, SOCKET WELD, SEAL CAP	
1	1 (25MM) PRESSURE REGULATOR, 1FPT, RANGE B(30-300psig), WO/STR	
1	OPTION 'O' FOR OUTLET PRESSURE REGULATOR FEATURE, RANGE B (30 to 300PSI)	
1	DUAL PRESSURE RELIEF VALVE KIT 1X1-1/4,R134A,SET 350 PSI	
1	4(100MM) PISTON CHECK VALVE W/WN FLGS	
1	Insulation	
1	Packaging Refrigeration System on a Common Structural Steel Base. 2 Circuit Chiller, NRU Chiller with Scrubbers, HPR. Compressor & Air cooled Condenser to be ship loose for field installation. Includes Instrument Wiring to a Common Terminal Box on the Edge of Skid. Controls are included for the Condenser and system. Refer to P&ID Package 2 Chiller SubTotal_____	$642,521

Qty	Description	Ext. Price

>>>>>>>>>> PACAGE #3 FEED COMPRESSION SYSTEM <<<<<<<<<<<<<<<<

1 Vilter Model VSG-3001-VVR-G-HP-EMD-42H-NEC-REM-AIR
Single Screw Gas Compressor Unit(s) designed for use with remote oil cooling and pre-piped in accordance with ASME B31.3 piping code with threaded joints minimized per Vilter's latest standards.
Standard unit features include:
< Single Screw Compressor with Parallex capacity and variable volume slide valves
< Unit mounted electric motor driven C-flange design lube oil pump, strainer and isolating valve
< Mounted Suction inlet Tee with Strainer and Wafer Check Valve - Carbon Steel Body with SS Internals
< Suction Block Valve - Carbon Steel Body with SS Internals (Shipped Loose)
< Discharge block and check valve - Carbon Steel Body with SS Internals (Shipped Loose)
< Full Flow Discharge Gas Relief Valve - (Shipped Loose)
< Multiple stage horizontal ASME Code gas/oil separator - Carbon Steel
< Motor Operated 2-way Oil Temperature Control Valve - Class I, Div 1, Group D Rated - Carbon Steel Body with SS Internals
< Unit Oil Line Relief Valve - Carbon Steel
< Large Capacity ASME Code lube Oil Filter - Carbon Steel.
< Transducers for Suction, Discharge, Filter Inlet and Oil Pressure each with block and Bleed Valves (Carbon Steel)
< RTD's Mounted in Wells for Suction, Discharge and Oil Temperatures
< Unit mounted NEMA 4 steel control enclosure with the following:
- Allen Bradley CompactLogix 1769-L33ER with 2 MB Memory
- Panel View Plus 1500 HMI/graphic Anti-Glare Display with Sun Shade
- ANSI 12.12.01 UL Listed and Labeled for Class I, Div 2, Group C & D
- Designed for indoor/outdoor service (30 Deg. F to 130 Deg. F)
< Unit wiring run inside 3/4" minimum Rigid Metal Conduit or Approved Cables.
< Unit primed and painted per Vilter Standard T00480 indoor/outdoor normal degree of protection against corrosion

Note:
1) All landfill gas applications require that a suction scrubber be installed prior to gas entering the compressor
2) The compressor oil separator will require insulation on all water saturated gas applications that do not use refrigeration or other dehydrating means prior to the gas entering the compressor

1 For outdoor high ambient 2200btu, 120vac, Class I, Div 2, Air conditioner, NEMA 4 ANSI Gray 61 - Cost per compressor

1 Thermal Blanket Insulation for Oil separator.

1 Dual Oil Filters with isolation, vent and drain valves for each filter.

7 Landfill Gas compression PAO oil (55 gal drum) part# 3143B (CP-4601-100)

1 1250 Hp Motor, 3600 Rpm, 4160v/3/60, WPII, Class 1 Div II w/ Heaters - 1.15 SF, 50 C Ambient temp rating, 100 Ohm 5earing and Stator RTD's

1 ##### Remote air cooled Oil cooler, with TEFC motor- shipped loose #######
< Each Unit will include : Axial Fan w/ (1) 10 hp Class 1 Div 2 VFD Motor - Wiring by others
< Each Unit will be a 1 Circuit Cooler for 1 Compressor :
< Air Cooled Oil Cooler 1 circuit based on 100 deg Ambient and 4000 feet elevaion :
< A) 117 gpm of Oil entering at 249 and leaving at 170 deg F.
Carbon Steel Construction. 2.25 KW Heater Kit, Gravity Dampers & Bug Screen. Heat Tracing & Insulation of Lines to and from the Compressor by others. RTD & Purge Valves Mounted

1 Bypass valve (Pneumatic) Fisher Globe Control Valve (Whisper III Trim) 87 dBA

1 ##### Remote air cooled After cooler, with TEFC motor(s), shipped loose #######
VSG 3001 Common After Cooler
< Unit will include : Axial Fan Forced Draft w/ (1) 15 hp VFD Motor - Wiring by others
< Unit will be a 1 Circuit Cooler for 1 Compressors :Unit Coil will be 304 SS & SS Pipe Header
< Unit will be a based on 100 Deg Ambient at 4000 ft Elevation :
< A) 4,152 SCFM of LFG entering at 249 and leaving at 115 deg F.
< RTD, Purge and Drain Valves Mounted

Package 3 Main Feed Compressor SubTotal $633,275

Qty	Description	Ext. Price

>>>>>>>>> PACKAGE #4 Sales COMPRESSION <<<<<<<<<<

1 Qty 1 GE Reciprocating Gas Compressor, air cooled, Two stage stage, 2 throw model A34 compressor , lubricated cylinders, SS compressor valves, lubricator, and natural gas compatible trim for each cylinder, crankcase heater, and flywheel/sheave.

Qty 1 Fabricated steel baseplate under all equipment, Lifting lugs
Qty 1 Drive: Direct coupled with Thomas CMR coupling
Qty 1 Standard drive guard

Qty 1 Double adjusting bolt adjustable slide base for motor

Qty 1 Painting- Standard

Qty 1 Relief Valve for each stage
Qty 1 350 HP TEFC motor; Severe Duty, High Efficiency, 1800 RPM, 3/60/460, 1.15 S.F. suitable for operation in Class I, Grp. C&D, Div. 2 area, inverter duty
Qty 1 Suction & Discharge pressure & temp. local indicators, all std RTD's and Tranducers
Qty 1 Discharge Separator, ASME Code CS with ultra fine .01 ppm coalescing element, drain valve, level gauge, pneumatic level controller, high level switch, with auto dump valve
Suction and Discharge pulsation bottles for each cylinder, ASME Code, CS
Qty 1 Suction and discharge butterfly valves, discharge check valve
Qty 1 Control panel with VFD PID loop control and compressor protection, Nema 4, panel
Qty 1 Recycle control valve, CS body, SS trim, air actuated with positioner mounted in recycle line from discharge separator to suction header

1 ##### 2 Circuit Remote air cooled Inter/After cooler, with TEFC motor(s), shipped loose #######
Common After Cooler
< Unit will include : Axial Fan Forced Draft w/ (1) 5 hp VFD Motor - Wiring by others
< Unit will be a 1 Circuit Cooler for 2 Compressors :Unit Coil will be CS & SS Pipe Header
< Unit will be a based on 100 Deg Ambient at 4000 ft Elevation :
< A) Each Circuit to do 1,540 SCFM of LFG entering at 266 and leaving at 115 deg F.
< RTD, Purge and Drain Valves Mounted

Package 4 Compressor SubTotal $928,800

Above Equipment Running SubTotal $2,653,193

@@@@@@@@@@@@@@@ SPARES @@@@@@@@@@@@@@@

1 Vilter Model VSG-501-CID-STD-SD-V $35,854
New Single Screw Bareshaft Compressor features include:
< Cast grey iron frame with cast ductile iron discharge manifold and gate rotor covers with discharge connection down
< Standard drive shaft is tapered
< Standard slide assembly
< Does not include handwheels or slide valve motors
< Viton shaft seal o-rings
< Discharge RTD Well (p/n 2611J)
< Compressor primed and painted per Vilter Standard T00480 indoor/outdoor normal degree of protection against corrosion
< Compressor Shipped in Wood Crate with Gauge & Nitrogen Charge with Long Term Storage Procedures (T25116)

Qty	Description	Ext. Price
1	Vilter Model VSG-3001-CIH-STD-SD-V New Single Screw Bareshaft Compressor features include: < Cast grey iron frame with cast ductile iron discharge manifold and gate rotor covers with discharge connection horizontal < Standard drive shaft is tapered < Standard slide assembly < Does not include handwheels or slide valve motors < Viton shaft seal o-rings < Discharge RTD Well (p/n 2611J) < Compressor primed and painted per Vilter Standard T00480 indoor/outdoor normal degree of protection against corrosion < Compressor Shipped in Wood Crate with Gauge & Nitrogen Charge with Long Term Storage Procedures (T25116)	$102,540
1	Bare Blower	$28,552
1	Basic Spare Parts for units with Allen Bradley control panel (Oil, RTD, 1 low press and 1 hi press transducer, Fuses, Shaft Seal for Compressor & Oil Pump, Actuator Slide Motor, A/B panel parts, 2 Oil Filters and Oil Sample Kit). Small Bearing Kit for Blower.	$19,524
	@@@@@@@ START UP, TRAINING @@@@@@@	
1	Start up costs provided are for estimation purposes only and at the time start up services are requested the rate sheet and terms and conditions will take precedence over any estimate Start-up supervison for Six (3) Screw compressor units, Blower Skid & Refrigeration Skids Includes the Following : Estimated Break Down based on 40 hour work week, which includes up o 4 Tech trips of Travel Time. Pre-Start Up Supervision and Inspection : 3 Week Compressor Tech & 1 week Controls Engineer (Power to all the equipment including Controls Communications) Start Up / Test Run System : 2 Weeks Compressor Tech & 1 Week Controls Engineer 1.5 Weeks Run System to Pipeline 1 Week Starter Engineer 1- 5 day week > Hands-On Training On at Site NOTE: Caliberation and Functional Site Documentation by others - Vilter will perform, but documentation by others. Does not include overtime, weekends or Holidays. Vilter Start-Up Pricing Structure is as follows: $160.00 / Hr > Time and a Half for Saturdays & Overtime and Double time for Sundays & Holidays. Cost of Hotel, Air Travel, Rental Car and Living Expenses. The following will be Required before Pre-Start Up and arrival of the Technician: > Units Piped and Wired > Motor/Compressor Coupling installed with Cold Alignment (Hot Alignment by others) > Oil Levels Check and filled to proper levels if required > Power to the Unit Note: Full attention of DCS Engineer to work with Controls Engineer During Pre-Start Up	$89,760

The above pricing does not include : Freight, Refrigerant, Pre-Start-Up Duties, Spare Parts , Applicable Taxes and Duty Fees. - Unless stated above.

Purchase orders over $100,000 are subject to progress payments.

Unless Otherwise Stated, this quotation, due to constant material cost increases, is valid for 30 days from quotation date.

Pre-Start Up Duties Include, but are not limited to : Refrigerant & Oil Charging of Equipment, Motor Cold and Hot Alignment, Verification of Power and Control wiring between and to skids, On site Pressure or Vacuum testing. - These can be performed by one of Vilter's GC Centers . Vilter can provide you with one upon request. (Pre-Start Up Check List will be provided upon Submittals)

The above Estimated Start-Up Costs are for Budgetary Purposes Only. Actual charges will be based on Vilter's "Technical Start Up / Service Rate Schedule". Vilter will provide this document upon request.

Payment Terms: Net 15
25% with placement of purchase order
30% upon receipt of complete drawing submittal package
30% upon receipt of major vendor equipment identified in proposal
15% upon shipment or notification of readiness to ship

The following is not included in the above quote unless othewise stated:

> Seismic Design & Documentation
> Adherence to State & Local Codes
> Factory Unit Run-In on Air
> Equipment and Valve Tagging
> ISA Documentation
> 3rd Party Inspections for Electrical & Code Verification adherence
> Piping and Electrical will adhere to B31.3, UL - Other codes will have to reviewed - additional costs, if required, will be added to the customer's account.
> On Site Training

The above that is not included can be quoted upon request.

THE ABOVE PRICING IS IN USD, NET EX-WORKS

SUBJECT TO VILTER'S STANDARD TERMS AND CONDITIONS

Commercial Proposal

8 June 2017

From:	Charles L. Anderson	*To:*	**Lyle Schlyer** **Jeff Pierce**
Phone:	(302) 225-2102	*Company:*	**Calgren Renewable Fuels** **SCS Energy**
FAX:	(302) 225-0412		
Subject:	**Membrane Biogaz System, 2500 CFM, (CM-16-09, Rev 3)**		

Dear Lyle and Jeff,

Air Liquide Advanced Separations (**ALAS**) a division of Air Liquide Advanced Technologies U.S. LLC is pleased to provide this firm proposal for a Membrane Biogaz System to process digester gas, as described in the following documents:

- Biogaz Recovery System Commercial Proposal, CM-16-09, Rev 3, dated 8 June 2017 (included below) (this "Commercial Proposal"); and
- Biogaz Recovery System Technical Proposal, CM-16-09, Rev 3, dated 8 June 2017 (attached hereto) (the "Technical Proposal").

Changes

This is Rev 3. The previous formal proposal was Rev 0. Changes since Rev 0 (considered Rev 1 and Rev 2) include a variety of design options studies exchanged with Jeff Pierce of SCS, namely feed flow options, pipeline quality product gas, lower operating temperature among others.

COMMERCIAL PROPOSAL

ALAS Scope of Supply

- System as described in Technical Proposal consisting of:
  - 2 stage process mounted on an open skid, Single Train
  - Membrane modules for 2500 CFM raw feed capacity making pipeline quality product gas. System can also operate at 5% CO2 in the product gas if desired, or any CO2 in between.
  - Optional lower cost purchase for 1800 CFM initial capacity, with easy field expansion to 2500 CFM. Note this option includes all the empty membrane vessels installed so that membrane can be added in the field in about 8 hours.
  - Inlet coalescing/particle filtration, process gas heating, sales gas purity control
  - Piping, Instrumentation, wiring, controls
- All drawings (available in 2D, pdf or dwg format) and documentation (no 3D drawings included, available at extra charge in dwf format)
- Integral participation in total plant HAZOP.
- Plant P&ID review
- Startup assistance and performance test (at daily rate, required for warranty, see below)

• Supervision of field module installation (required only if some membranes are installed at startup)
• Mechanical and performance warranty (see below)

Customer Scope of Supply
• Complete plant HAZOP
• Complete plant P&IDs defining process conditions at all key locations on the drawings
• All feed gas pre-treatment (removal of oil, water, VOCs, H2S, particles)
• Feed, recycle and final compression
• Feed gas temperature and pressure control
• Liquid separator after feed compressor aftercooler
• Flow measurement and sales gas quality measurement
• Waste gas thermal destruction in flare/oxidizer
• Instrument air supply
• Calibration Gas
• Electrical power
• Coalescer liquid drain disposal
• Building and Site works (including but not limited to concrete pad, site lighting, etc.)
• Membrane system installation
• Hi speed web connection for ALAS remote monitoring (required for warranty)
• Transport from FCA Workshop or ALAS, Newport, DE to site
• Permits or other authorizations of any kind
• Insurance and taxes, duties and fees of any kind
• Spare parts of any kind
• Labor for field module installation, if required, under ALAS supervision (typically 2 people for 1 day).
• Control room furniture to accommodate operator interface desk top PC and monitor.
• Inert gas for purging and inerting of system.
• Ambient atmospheric monitoring.
• Anything not clearly defined in this Commercial Proposal or not set forth in ALAS's scope of supply above

Budget Price (local taxes, insurance, duties, fees, permits, or any other governmental charges NOT included)

Membrane Biogaz System, 2500 CFM, 1% CO2:	$ 1,330,000 (U.S.)
-Option 1800 CFM initial at 1% CO2, easy expansion to 2500 CFM:	$ 1,200,000 (U.S.)
Field expansion cost:	$ 130,000 (U.S.)
-Option 1800 CFM initial at 5% CO2, easy expansion to 2500 CFM:	$ 1,100,000 (U.S.)
Field expansion cost:	$ 230,000 (U.S.)
Daily rates for startup and on-site assistance:	$1,500 US per 8 hour day plus expenses per person, portal to portal basis. Allow for 2 people x 10 days each.

Estimated Timing
After receipt of order and system down payment, depending upon shop loading at the time, estimated skid delivery is **approximately 24 weeks** after receipt of down payment. Some or all membrane elements may be installed prior to skid shipment. If not all membrane elements are installed prior to skid shipment, the balance will be installed in the field under ALAS supervision, just before startup. The exact timing will not be known until a short time before receipt of order since other system orders are expected soon.

Terms

- 25% down payment, invoiced 1-2 weeks after receipt of order, payable upon receipt.
- 25% after Customer approves drawings and is ready for ALAS to formally start and order long lead items, payable net 30 days. Eight (8) weeks are allowed for drawings, approval and receipt of payment.
- 25% upon receipt of PSA and carbon tower vessels, payable net 30 days.
- As the system is substantially completed and prior to checkout, ALAS will invoice the remaining 25% balance, payable upon receipt and to be received by ALAS before ex-works delivery. (Customer is free to visit workshop for inspection if desired upon reasonable advance written notice and during normal business hours.)
- Electronic transfer of funds is routinely accepted by ALAS.
- FCA Workshop or ALAS, Newport, DE but loaded on Customer's truck at ALAS's expense. Securing of load on truck is within the Customer's scope of responsibility.
- ALAS Standard Terms and Conditions, dated 2/2/2016, are attached and made a part hereof and shall apply to the parties, which shall include provisions relating to startup and on-site assistance, if any (the "PO Terms and Conditions").

Safety

A word about safety. No one ever plans to intentionally build an unsafe biogas plant. However, after having been a part of 21 biogas plants, ALAS has experienced a range of plant design, startup and operational safety issues. Some plants have been designed, started up and operated quite safely while others not so much. In some cases, ALAS has insisted upon changes during startup and has had to even leave the plant site. The Customer and ALAS should begin close technical coordination as soon as possible after receipt of the purchase order. One of the most important things for ALAS would be participation with the customers design team in a complete plant HAZOP. ALAS recommends that the HAZOP be facilitated by someone not directly affiliated with the project or perhaps specializes in plant process HAZOPS. Another key item is a formal review of plant P&IDs with ALAS. These safety concerns are best taken care of early in the design and not at startup.

Proposal Validity

This proposal is **valid through 31 July 2017.**

Mechanical Warranty

Subject to any and all limitations contained in this Commercial Proposal and the PO Terms and Conditions, ALAS warrants all equipment provided by it or any of its subcontractors to be free of defects in workmanship and materials and against mechanical failure for a period of one (1) year from the start-up or eighteen (18) months from skid shipment, whichever occurs first. Subject to any and all limitations contained in this Commercial Proposal and the PO Terms and Conditions, ALAS also warrants that all work performed by it or any of its subcontractors shall be performed in a good and workmanlike manner, with such warranty running for a period of one (1) year from the performance of the work in question.

Component warranties can be pursued with ALAS or directly with the supplier. ALAS will provide a replacement component upon request, ex-works ALAS. Customer must return the faulty component to ALAS as soon as possible so that ALAS can obtain warranty coverage with the component manufacturer. Warranty coverage excludes damage due to improper operation and for the other exclusions set forth in the PO Terms and Conditions.

Customer is responsible for all operation and maintenance.

Startup Performance Warranty
The feed gas composition, pressure and temperatures must be proven to be as described in the Technical Proposal. Given these conditions and subject to any and all limitations contained in this Commercial Proposal and the PO Terms and Conditions, the system will produce 1451 SCFM (or 1047 SCFM for the lower flow option) of product gas with no more than 1% CO2, less than 7 lbs water per MMSCF. Also, hydrocarbon recovery will be no less that 96% during a 24 hour performance test. Note that the hydrocarbon recovery predicted in the Technical Proposal may be slightly higher.

For Customer's acceptance of the system, a performance test run shall be performed by the Customer under supervision of ALAS. Performance Test Run shall be performed for consecutive 24 (twenty-four) hours (or as agreed by both parties) with stabilized conditions of the system based on performance figures herein and in the Technical Proposal. Upon satisfactory performance test results, an acceptance certificate will be signed by both parties indicating satisfactory performance with or without conditions. If during the acceptance performance test run the guaranteed performances cannot be reached, both parties shall make a bilateral document with actual performances recorded. If the Performance Test Run is not accomplished prior to a time 6 months from skid shipment or 1 month after gas is first introduced, then the system will be considered to have met the Startup Performance Warranty.

The startup performance warranty is subject to ALAS being present at startup, design conditions being met, proper installation and operation of the system.

Longevity Warranty
No longevity performance warranty is offered beyond startup. The Startup Performance warranty automatically terminates upon successful start-up of the system (as described above).

System Operation and Maintenance
The startup performance warranty and the longevity warranty are valid only if the membrane system is operated properly and maintenance/inspection program is strictly followed by customer. ALAS's operating manual will include a required maintenance and inspection program. Carbon change will be an important component of the maintenance program.

ALAS reserves the right to improve the maintenance/inspection program. Maintenance and inspection program must be implemented by Customer.

ALAS will visit the membrane system during the warranty period, at ALAS's expense, as required to verify proper operation.

Warranty Limitation of Liability
ALAS's limitation of liability with respect to warranty claims shall be as provided in the PO Terms and Conditions. ALAS is not liable for any claim made after the expiration of the applicable warranty period.

ALAS Marketing
ALAS will have the right to include these membrane systems on its natural gas membrane reference list. Information would include Customer name, site name and location, feed and product gas conditions.

With Customer's approval and coordination (which shall not be unreasonably withheld, delayed or conditioned), ALAS will have the right to present public papers about the membrane system and its performance.

With Customer's approval and coordination (which shall not be unreasonably withheld, delayed or conditioned), ALAS may from time to time request to make short visits to one of the sites with potential new customers for the purpose of showing potential new customers that the ALAS system works.

Dispute Resolution
Should any dispute, claim or controversy occur relating to the membrane module, this Commercial Proposal, the Technical Proposal, the PO Terms and Conditions or any other matter, then the provisions of Section 10.5 of the PO Terms and Conditions shall apply.

Please do not hesitate to contact me to discuss any aspect of this proposal.

Best Regards,

Charles L. Anderson
Director of Biogas Technology & Advanced Separations Solutions Development
---
Air Liquide Advanced Business & Technologies
Newport, Delaware USA
Ph: +1 302 225-2102

TECHNICAL PROPOSAL

To: **Lyle Schlyer, Jeff Pierce**
Calgren Renewable Fuels, SCS Energy

For: **Digester Gas Processing**

Subject: 3000 CFM Biogaz Membrane System
CM-16-09, Rev 0

From: Air Liquide Advanced Separations
a division of Air Liquide Advanced Technologies U.S. LLC
305 Water St
Newport, DE 19804

Date: 8 June 2017

Introduction

Air Liquide Advanced Separations (ALAS) is pleased to provide this proposal for a membrane system for processing digester gas. The system that we propose is a two stage type of separation system intended to reduce digester gas CO2, O2, water, and H2S content while increasing the CH4 concentration.

Information is confidential.

Air Liquide Biogas Experience

Project/Location	Start-up	Raw Feed (MMSCFD)	Sales Gas Destination
Laurel Highlands (Raeger Mtn, PA)	Jul-06	4	Dominion pipeline system
Iris Glen (Johnson City, TN)	Nov-06	2	Mountain Home VA Center co-gen facility
Greentree (Kersey, PA) (2 Trains)	Jul-07	12	Interstate Pipeline National Fuel Gas Supply
Imperial (Imperial, PA)	Sep-07	6	Interstate Pipeline National Fuel Gas Supply
Shade (Cairnbrook, PA)	Jun-07	4	Dominion pipeline system
Southern (Davidsville, PA)	Jun-07	2	Dominion pipeline system
Oklahoma City (OKC, OK)	May-08	2	Southern Star Pipeline
Carter Valley (Church Hill, TN)	Nov-08	2	Intrastate pipeline system of Tengasco, Inc.
Winder (Winder, GA)	Dec-08	6	Municipal Gas Authority of Georgia LDC
Live Oak (Atlanta, GA)	Feb-09	7	Atlanta Gas & Light Local Distribuion
Cedar Hills (Seattle, WA)	Feb-09	16	Puget Sound Energy Local Distribution
Seneca (Pittsburgh, PA)	Dec-10	4	Dominion pipeline system
River Birch (New Orleans, LA)	May-10	9	ATMOS Pipeline, LDC
Meadow Branch (Athens, TN)	Aug-11	3	Spectra Energy's East Tennessee Pipeline
Pt Loma WWTP (San Diego, CA)	Mar-12	2	SDG&E
Fresno WWTP (Fresno, CA)	Mar-12	2	Local plant use
Milam/WM (E St Louis, IL)	Nov-14	5	Pipeline, eventual CNG vehicle
Seneca Meadows (NY)	Apr-14	4.3	Pipeline
SWACO (Ohio)	Apr-14	8.6	Pipeline
WWTP (Chile)	Jul-15	2.8	Pipeline
Oklahoma City (OKC, OK)	Aug-15	4	Southern Star Pipeline
NEML (Walnut, MI)	Mid 2017	5	Kinder Morgan Pipeline
Outer Loop (Louisville, KY)	Mid 2017	8	Pipeline
Atascocita LF (Humble, TX)	Mid 2017	10	Pipeline
SE OKC (OKC, OK)	Mid 2017	4	Pipeline
Eagle Point (Ball Ground, GA)	Mid 2017	9	AGL Pipeline
Southern LF	Mid 2017	6	Pipeline
	TOTAL	**150**	

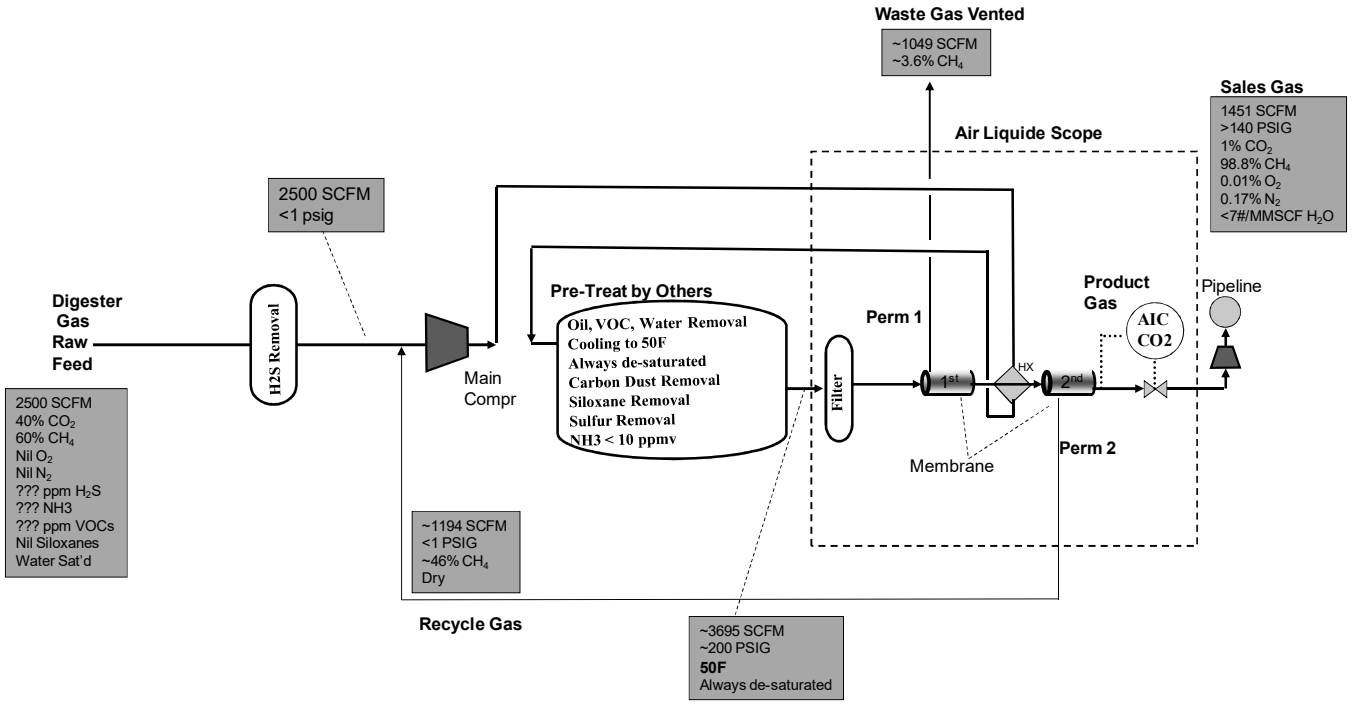
Changes

This is Rev 3. The previous formal proposal was Rev 0. Changes since Rev 0 (considered Rev 1 and Rev 2) include a variety of design options studies exchanged with Jeff Pierce of SCS, namely feed flow options, pipeline quality product gas, lower operating temperature among others.

Customer Requirements

- Raw Feed capacity: 2500 CFM from cow manure digester. Note this flow may be lower (1800 CFM) initially. Upgrading system must handle turn down.
- Feed composition: Not given but assumed typical, nil O2 and N2 (note we do show trace amounts of O2 and N2 in the process calculations). NH3 and H2S will be present and will be removed by customer.
- Customer will be responsible for feed gas pre-treatment.
- H2S strategy: Customer will remove upstream.
- Turn Down: Customer needs “significant turn down”. (system can accommodate turn down to 10% of design flows or lower by manual isolation of membrane elements, a few seconds per membrane).
- Product gas nominal composition: 1 or 5% CO2, dry, clean. Option for 5% CO2 if product gas is used locally or 1% if going to pipeline. System must work either way.
- Product gas pressure: 255 PSIG (booster will be needed).
- Assumed outdoor install, Pixley, CA environment.

System Process Flow Diagram (2500 CFM Case with 1% CO2 Product)



Note: above numbers are approximate. See formal process calculations below.

Process Description

Digester gas, along with the membrane recycle stream from the 2nd stage membrane, is compressed up to about **200 psig**. Water vapor, VOCs, sulfur, H2S, NH3, particlates and siloxanes, if present, will be reduced/removed by the customer. This feed gas will be cooled by customer to 50F prior to entering the membrane skid. Note this gas should be cooled to a lower temperature and reheated to be desaturated.

Within the membrane skid, the feed gas passes through a backup coalescing/particle filter for additional membrane protection. **Note, customer should consider this a backup/insurance filter and absolutely not the primary filter**. The gas exiting the filter is then introduced into the 1st stage membrane elements where the bulk of the CO2 is removed as a low pressure "Permeate1" stream. This "Permeate1" stream is vented. The high pressure Residue-1 stream from the first stage passes through HX-2 *(Hot process gas from the feed compressor, prior to any cooling, will be used for heating)* where the temperature is raised to the desired set point and is introduced into a second membrane stage where the CO2 content is polished to produce very low CO2 sales gas (which may need to be compressed up to the pipeline pressure). The low pressure Permeate-2 from the second stage is recycled to the suction of the feed compressor to limit hydrocarbon losses.

A final purity control valve and CO2 analyzer operate via a PLC PID loop to control product gas CO2.

Process Mass Balance

2500 CFM, 1% CO2

Component	Raw Feed	Mixed Feed with Recycle/ Compr Suction	Compr Disch	Feed 1	Permeate 1	Residue 1	Feed 2	Permeate 2/ Recycle	Residue 2/ Sales Gas	
	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	
CO2	40.8385	45.0205	45.0205	45.0205	95.9454	24.8231	24.8231	53.7779	1.00	Btu/SCF
CH4	59.0000	54.8023	54.8023	54.8023	3.9049	74.989	74.989	46.0120	98.8	1000
O2	0.0100	0.0207	0.0207	0.0207	0.0142	0.0232	0.0232	0.0430	0.0070	
N2	0.1000	0.1005	0.1005	0.1005	0.0133	0.1351	0.1351	0.1016	0.1627	
H2S	0.0010	0.0026	0.0026	0.0026	0.0018	0.0029	0.0029	0.0059	0.0004	
H20	0.0505	0.0535	0.0535	0.0535	0.1204	0.0269	0.0269	0.0597	0.0000	
	100.0000									
Flow (SCFM)	2,500	3,695	3,695	3,695	1,049	2,646	2,646	1,194	1,451	
Flow(MMSCFD)	3.600	5.321	5.321	5.321	1.511	3.810	3.810	1.720	2.090	
(MMSCFD)		5.387	5.387					1.786		
Flow(Nm3/H)	4019	5938	5938	5938	1686	4251	4251	1919	2332	
Recycle Ratio		1.50								
			System Feed							System Outlet
Pressure (PSIG)			200.0	190.0	1.0	183.94	181.94	4.0	179.28	up to 140
Pressure(bara)			14.803	14.113	1.082	13.70	13.558	1.289	13.37	
Temperature(°C)			3	10			26			
Dew Pt (°C)					-20					
% CH4 Recovery									97.2%	
					Local Baro					
					14.7					

1800 CFM, 1% CO2

Component	Raw Feed	Mixed Feed with Recycle/ Compr Suction	Compr Disch	Feed 1	Permeate 1	Residue 1	Feed 2	Permeate 2/ Recycle	Residue 2/ Sales Gas	
	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	
CO2	40.8385	46.0880	46.0880	46.0880	96.1899	26.3113	26.3113	57.0522	1.00	Btu/SCF
CH4	59.0000	53.7355	53.7355	53.7355	3.6614	73.501	73.501	42.7398	98.8	1000
O2	0.0100	0.0209	0.0209	0.0209	0.0138	0.0237	0.0237	0.0437	0.0072	
N2	0.1000	0.0984	0.0984	0.0984	0.0124	0.1323	0.1323	0.0950	0.1630	
H2S	0.0010	0.0026	0.0026	0.0026	0.0018	0.0030	0.0030	0.0060	0.0005	
H20	0.0505	0.0546	0.0546	0.0546	0.1207	0.0286	0.0286	0.0632	0.0000	
	100.0000									
Flow (SCFM)	1,800	2,663	2,663	2,663	754	1,909	1,909	862	1,047	
Flow(MMSCFD)	2.592	3.834	3.834	3.834	1.085	2.749	2.749	1.241	1.508	
(MMSCFD)		3.882	3.882					1.289		
Flow(Nm3/H)	2893	4279	4279	4279	1211	3068	3068	1385	1682	
Recycle Ratio		1.50								
			System Feed							System Outlet
Pressure (PSIG)			200.0	190.0	1.0	183.58	181.58	1.0	178.81	up to 140
Pressure(bara)			14.803	14.113	1.082	13.67	13.533	1.082	13.34	
Temperature(°C)			3	10			25			
Dew Pt (°C)					-20					
% CH4 Recovery									97.4%	
					Local Baro					
					14.7					

1800 CFM, 5% CO2

Component	Raw Feed	Mixed Feed with Recycle/ Compr Suction	Compr Disch	Feed 1	Permeate 1	Residue 1	Feed 2	Permeate 2/ Recycle	Residue 2/ Sales Gas	
	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	mol%	
CO2	40.8385	49.7157	49.7157	49.7157	96.8902	31.6249	31.6249	70.3253	4.00	Btu/SCF
CH4	59.0000	50.1146	50.1146	50.1146	2.9620	68.197	68.197	29.4861	95.8	970
O2	0.0100	0.0169	0.0169	0.0169	0.0099	0.0196	0.0196	0.0329	0.0101	
N2	0.1000	0.0895	0.0895	0.0895	0.0098	0.1201	0.1201	0.0653	0.1593	
H2S	0.0010	0.0022	0.0022	0.0022	0.0013	0.0025	0.0025	0.0049	0.0008	
H20	0.0505	0.0611	0.0611	0.0611	0.1267	0.0359	0.0359	0.0855	0.0004	
	100.0000									
Flow (SCFM)	1,800	2,576	2,576	2,576	714	1,862	1,862	776	1,086	
Flow(MMSCFD)	2.592	3.710	3.710	3.710	1.028	2.681	2.681	1.117	1.564	
(MMSCFD)		3.756	3.756					1.163		
Flow(Nm3/H)	2893	4140	4140	4140	1147	2992	2992	1246	1746	
Recycle Ratio		1.45								
			System Feed							System Outlet
Pressure (PSIG)			200.0	190.0	1.0	182.22	180.22	1.0	175.75	up to 140
Pressure(bara)			14.803	14.113	1.082	13.58	13.439	1.082	13.13	
Temperature(°C)			3	10			25			
Dew Pt (°C)					-19					
% CH4 Recovery									98.0%	
					Local Baro					
					14.7					

Caution: The "Raw Feed" compositions and flows shown above contain only as much water as will be present in the saturated feed to the membrane skid. Significantly greater amounts of water can be contained in the raw feed at low pressure. This analysis only addresses composition changes through the membrane process and does not include water removal due to condensation.

Caution: The above calculations do not represent performance warranty values. See the commercial proposal for warranty values.

Supporting Documents

- Preliminary Drawings (P&ID, General Arrangement) To be provided in future.

General Conditions

Feed Gas Requirements

- Design feed pressure range, at Biogaz System inlet is **200 psig**.
- Maximum feed pressure of 250 psig. IMPORTANT: a relief valve set at 250 psig must be provided by customer.
- Feed gas compressor pressure control must maintain smooth control with varying flow demand at nominal design pressure and prevent "lifting" the relief valve.
- ALAS requires feed temperature to be 50F to meet predicted recovery. Operation at higher temperatures is not a problem and does not reduce flow capacity or product gas quality.
- Max inlet temperature must be <120°F (with performance impact). Minimum inlet temperature must be above freezing.
- Feed gas must be de-saturated at any condition, meaning no entrained liquid water , a dew point less than feed temperature.. The ALAS system feed should have no liquids – no water, acids, or hydrous ammonia. Suggest a 10°F dewpoint margin.
- Feed gas flow, pressure and composition (see mass balance calculations).
- Feed gas must be oil free (aerosol and vapor), and free of siloxanes, H2S, ammonia, and carbon dust.
- A recycle line from the permeate gas of the 2nd stage will also be mixed with digester gas prior to system inlet. Feed flowrate to the Membrane System will be made up exclusively of the digester gas stream and the 2nd stage permeate gas stream.

Product Gas Specifications

- Product gas CO2 content will be controlled by varying/limiting product flowrate with a control valve and CO2 analyzer PID loop. CH4 concentration will be assumed. Alternatively, flow control can be done with the product booster compressor.
- Product flowrate (see Warranty and mass balance calculations)
- Product pressure, after the purity control valve (FCV-1) can be as high as 140 psig if necessary without affecting system capacity. However, it is recommended to design so this can drop as low as 120 psig. This will yield more operation flexibility if raw gas flows vary.
- Product compressor should be sized for lower pressure for best overall system control tolerance and still achieve design flow rates.

Power Requirements

- 120 VAC, 20 Amp, 60 Hz, 1 Phase, 1 circuit

Instrument Air Requirements

- Clean dry air, no methane, 100 PSIG, 10 SCFM. Suggest descicant drier, -40° dew point.

Nitrogen Requirements

- As needed for purging. **(System must be purged before introducing digester gas)**

CO2 Analyzer Cal Gas Requirements

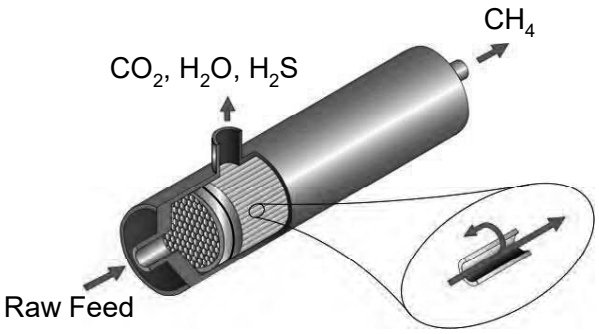
- 2.5% CO2, balance methane, 30 psi regulator
- zero gas, pure methane, 30 psi regulator

Recycle Stream

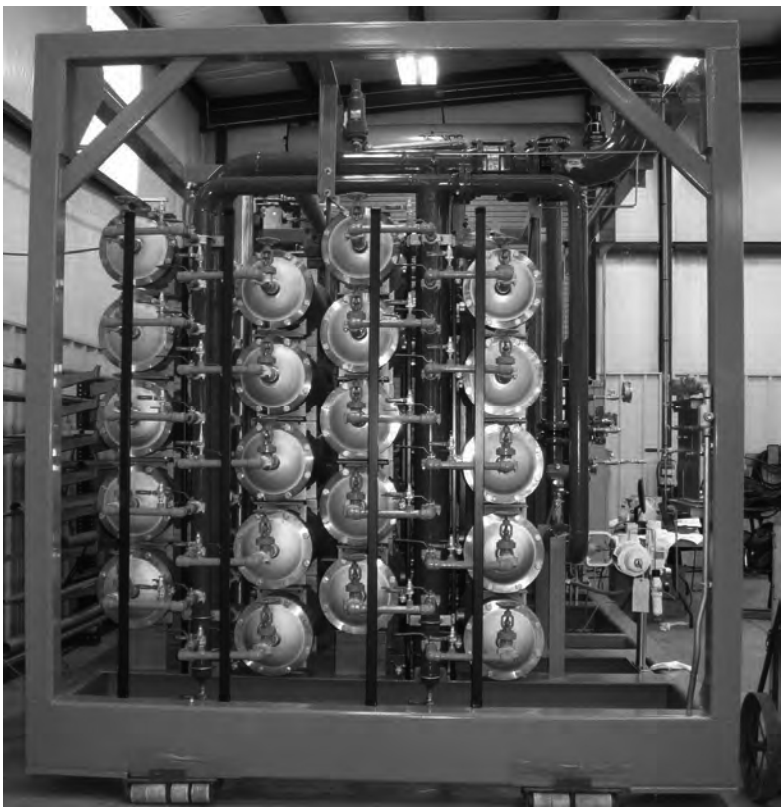
A recycle stream from the 2nd stage permeate must be returned to the suction of the main feed compressor or blower. This stream will inherently be at near atmospheric pressure.

Design Features

- ALAS's MEDAL hollow fiber counter current membrane element.



- Variable number of membranes and room for expansion (see below).



- The system will be designed for Class 1, Div. 2, Group C&D. Electrical cabinet will be Z purged (see instrument air requirements).

- Feed gas pre-treatment system
  - Backup (insurance) coalescing/particulate filter to remove trace amounts of inlet water aerosol and particles in case customer pre-treat fails.
- Inlet Shutoff Valve
  - An inlet shutoff valve will be located before the membrane system to stop flow under alarm conditions.
  - Valve will close if inlet temp >125°F.
- Customer connection points (sizes are preliminary):
  - Feed: 6” 150# RF Flange
  - Product: 4" 150# RF Flange
  - Relief Valve vent: 6" 150# RF Flange
  - 1st Stage Permeate: 8" 150# RF Flange
  - 2nd Stage Permeate: 6” 150# RF Flange
  - Drain: 1/2" NPT (customer responsible for disposal)
  - Instrument Air: 1/2" NPT
  - Analyzer Sample Vent: 1/2" NPT (must be separate vent to atmosphere)

Instrumentation

- System controlled by AB PLC
- Operator Interface Terminal
- CO2 analyzer (product gas)
- O2 analyzer to monitor membrane inlet for safety reasons.
- Remote web based monitoring system. (customer must provide high speed internet connection)
- Note: no sales gas instrumentation is provided other than the CO2 analyzer (no flow, moisture, Btu, O2 or H2S)

Materials and Packaging

- Process piping includes all welded steel or stainless steel (per ANSI B31.3 and ASME Section VIII). 304 SS used for inlet piping & filter. Carbon steel elsewhere (where gas is normally dry). Membrane vessels are carbon steel but zinc chromate electroplated inside and out.
- Preliminary Skid dimensions: 22' L x 10' W x 13' H.
- Preliminary Skid Weight estimate: 30,000 Lbs.
- System installed in an open framed structure.
- Built and supported to withstand shock and vibration due to transport.
- **Rated for interior or exterior spaces that normally are above freezing. No heat tracing or insulation provided.**
- Accessibility to all needed service points.
- No additional hardware / spare parts/ or special tools are needed for start-up and commissioning. However, Air Liquide recommends for the customer to have operating spare parts on hand at time of commissioning in order to avoid delays if unexpected problems are encountered. Recommended list of operating spares will be developed during fabrication and will include such things as solenoid valve, control valve.

Safety

- **General:** A word about safety. No one ever plans to intentionally build an unsafe biogas plant. However, after having been a part of 21 biogas plants, ALAS has experienced a range of plant design, startup and operational safety issues. Some plants have been designed, started up and operated quite safely while others not so much. In some cases, ALAS has insisted upon changes during startup and has had to even leave the plant site. The Customer and ALAS should begin close technical coordination as soon as possible after receipt of the purchase order. One of the most important things for ALAS would be participation with the customers design team in a complete plant HAZOP. ALAS recommends that the HAZOP be facilitated by someone not directly affiliated with the project or perhaps specializes in plant process HAZOPS. Another key item is a formal review of plant P&IDs with ALAS. These safety concerns are best taken care of early in the design and not at startup.

- Proper inerting of the skid must be performed prior to and after any maintenance work is carried out. Inerting instructions will be provided in the Air Liquide Operating Manual and must be diligently followed.

- The ALAS skid is equipped with relief devices set for 250 psig. If the skid becomes blocked in, all the process piping could come up to 250 psig. All customer components (piping, equipment) that tie in downstream of the ALAS skid should be rated for 250 psig or protected by a safety valve.
- Customer must provide safe and adequate access to all process equipment. The General Arrangement Drawing will specify how much space must be allowed around and above the skid for access.

General Arrangement

Following is a preliminary general arrangement.

Safety Devices

- Hard wired over-temperature protection
- Membrane inlet high oxygen.
- Pressure relief valves for over-pressurization of vessels (thermal relief only).

Spare Parts

- Spare parts: One set of spare fuses and light bulbs will be provided by Air Liquide.
- It is strongly recommended that customer have operating spares on hand at startup. If any parts fail that are covered by ALAS's mechanical warranty, customer can replace failed part immediately (minimizing down time) and ALAS can then replace the part in customer's spares stock.

Estimated OPEX Allowances

Inlet Coalescing Filter:	Only change on pressure drop, maybe never.
Calibration Gas:	$120/Yr cylinder rental
Misc skid electrical & mechanical:	$ 1,000/Yr (1st year is warranty coverage)
One time spares stocking:	TBD

PURCHASE ORDER TERMS AND CONDITIONS OF SALES – SYSTEMS WITH FIELD SERVICES (2-2-16)

The items described in the purchase order (referred to separately and collectively as the "Equipment") are hereby offered for sale at prices to be established by Air Liquide Advanced Separations (**ALAS**), a Division of Air Liquide Advanced Technologies U.S. LLC, 305 Water Street, Newport, Delaware, 19804, USA ("Seller"). This offer and its acceptance by any "Buyer" shall be governed by all of the terms and conditions stated herein. Buyer's order for any Equipment described in its document, when communicated to Seller, verbally or in writing, shall constitute acceptance of this offer. All descriptions, quotations, proposals, offers, acknowledgements, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to the terms and conditions stated herein. Any terms or conditions proposed by Buyer in any Buyer document that are in addition to, or inconsistent with, the terms or conditions stated herein are hereby objected to. No such additional, different or inconsistent terms or conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing in advance by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms or conditions stated herein that are in addition to, or inconsistent with, those contained in Buyer's offer. Acceptance of Seller's Equipment shall in all events constitute such assent.

1. PAYMENT.
All payments to Seller shall be made at the locations indicated on Seller's invoice. All invoices shall be payable net cash by Buyer within thirty (30) days of the date of the invoice, unless otherwise expressly stated in Seller's applicable commercial proposal (the "Commercial Proposal"). Buyer shall also pay all taxes, except Seller's income tax. Seller may also collect from Buyer on any delinquent balance a charge at a rate of 1.5% per month or, if less, the maximum rate permitted by law. Payments 60 days past due will result in Buyer being put on credit hold. The Buyer will only be released from credit hold when all outstanding payments are satisfied.

2. DELIVERY AND INSTALLATION.
Unless otherwise expressly stated in the Commercial Proposal, the Equipment shall be delivered FCA Workshop or ALAS, Newport, DE (INCOTERMS 2000) at Buyer's expense and Buyer shall be deemed to have accepted the Equipment on the day of such delivery. Transport shall be at Buyer's expense, including but not limited to obtaining transportation and other applicable permits, licenses and authorizations. If the Equipment is of the kind that requires installation, Buyer shall be responsible, at Buyer's expense, for site preparation (if any) and installation of the Equipment (including securing all applicable permits) unless otherwise agreed in writing by Seller.

3. USE, MAINTENANCE AND ALTERATIONS.
Buyer shall not make any alterations or additions to the Equipment or replace any part of the Equipment without the prior written authorization of Seller. In the event that Buyer makes any alteration or addition, or replaces any part with components which are not identical to the original components without Seller's prior authorization in writing, or uses or operates the Equipment other than in the manner specified in the applicable Seller's operating manual (the "Operating Manual"), any warranty with respect to the Equipment shall immediately terminate.

4. RISK OF LOSS AND INSURANCE.
Risk of loss and title to the Equipment or any part thereof shall pass to Buyer upon delivery of the Equipment to carrier EX Works Newport, Delaware (INCOTERMS 2000). Prior to receipt by Seller of full payment of the price, Buyer, at its own expense, and for the benefit of Seller, shall insure the Equipment from the date of shipment to Buyer against all risk of loss or damage from any cause, including but not limited to fire and theft, for not less than the price. Seller shall be specified as loss payee with respect for such insurance coverage and Buyer shall furnish to Seller prior to delivery a certificate evidencing such insurance coverage.

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5. INDEMNITY.
Notwithstanding anything herein to the contrary, Buyer agrees to defend, indemnify and hold Seller and its employees and affiliates harmless from and against any and all claims (including, but not limited to, all costs, expenses, suits, damages, liabilities, losses, fines, penalties and reasonable attorneys' fees and court costs) which may directly or indirectly arise in connection with: (i) the use of the Equipment after its commissioning, or (ii) any alteration or addition to the Equipment or replacement of parts without the prior written authorization of Seller.

If there is any injury (including death), loss or damage to the person or property of any third party (including employees of either party), then, subject to any limitations set forth in this Agreement, each party agrees to indemnify the other party to the extent of the indemnifying party's negligence.

6. WARRANTIES, HAZARDS AND LIMITATION ON LIABILITY.

6.1 Limited Warranty.
Subject to any and all limitations contained in this Agreement (including but not limited to this Section 6), Seller provides only the mechanical (including services) and startup performance warranties (collectively "Warranty") set forth in the Commercial Proposal. Goods manufactured by Seller that are provided by Seller as a repair or replacement during the applicable warranty period and not as a general consumable (wear and tear limited life) of the Good shall be warranted against defects in material and workmanship for the remainder of the applicable warranty period or (90) days from the date of shipment of such Good, whichever is longer.

Seller acknowledges that Buyer may assign this Agreement, including the Warranty, to another party ("New Owner") through an assignment document in form and substance acceptable to Seller in advance, at which point any warranty claims shall only be brought by New Owner and Seller shall have no further liability to Buyer. Upon such assignment, New Owner shall be deemed to be the "Buyer" for all purposes hereunder and Seller's obligations and liabilities hereunder shall only be to New Owner and New Owner shall be bound by all of the terms and conditions hereunder, in the Commercial Proposal and Seller's applicable technical proposal.

Buyer's sole remedy, and Seller's sole liability, for breaches of the Warranty is as set forth in Section 6.3 below. The Warranty period shall be as provided in the Commercial Proposal. Seller is not liable for any claim made after the expiration of the applicable Warranty period. All warranties provided by Seller in the Commercial Proposal are completely void if the Equipment is operated improperly by Buyer, including but not limited to:

(i) pollution of the site with contaminants;
(ii) improper maintenance or improper storage;
(iii) operation of the Equipment above specified feed gas temperature limits;
(iv) operating the Equipment such that the membrane inlet pressure is above maximum design pressure;
(v) failure to follow system installation guidelines;
(vi) non proper handling of the Equipment;
(vii) any attempt to modify the Equipment (or any part thereof);
(viii) failure to upgrade the Equipment (or any part thereof) within six months following Seller's notification of a problem/corrective action; or
(ix) failure to operate the Equipment according to instructions in the Operating Manual.

Further, Buyer must:
(i) provide a complete written description of the problem; and

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(ii) provide a copy of operation and maintenance documents.

The limited warranty set forth above does not extend to repair or replacements resulting from normal wear and tear, including consumables such as filter elements, adsorbents, fuses and depleting sensor elements. All removal, installation and shipping costs will be borne by the Buyer.

If the Equipment is not manufactured by Seller, no representation or warranty is given by Seller regarding the Equipment, but if any warranty is provided by the manufacturer of the Equipment to Seller, and such warranty by its terms may be extended to Buyer, Seller shall cooperate with Buyer in having the warranty extended. SELLER MAKES NO OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

6.2 Hazards.

Buyer acknowledges that there are hazards associated with the use of the Equipment and the gases produced from the Equipment. Buyer shall be responsible for training its employees, customers and all others exposed to such hazards in the proper uses of the Equipment and for taking all appropriate actions to warn and protect such individuals. Buyer acknowledges its understanding that the gases produced by the Equipment are classified by the U.S. Occupational Safety and Health Administration ("OSHA") as hazardous chemicals and that the OSHA regulations require Buyer to develop and implement a written chemical hazard communications program for its employees regarding all hazardous chemicals. Buyer acknowledges that Supplier has supplied (or will supply) Buyer with certain Material Safety Data Sheets ("MSDSs") relating to the gases produced by the Equipment, and that more MSDSs are available from Seller on request. Buyer understands that the Equipment must not be used without consulting the MSDSs, and will ensure that all employees, customers and others who may be exposed to the gases produced by the Equipment receive and refer to the MSDSs.

6.3 Damage limitations.

SELLER SHALL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES. SELLER'S SOLE LIABILITY AND BUYER'S SOLE REMEDY FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY DAMAGES RESULTING FROM OR OCCURING TO EQUIPMENT MANUFACTURED BY SELLER, SERVICES PROVIDED BY SELLER OR SELLER'S FAILURE TO DELIVER SUCH EQUIPMENT OR SERVICES, SHALL BE LIMITED TO, AT SELLER'S OPTION, REPAIR OR REPLACEMENT OF THE EQUIPMENT AT ISSUE OR REPERFORMANCE OF THE SERVICES AT ISSUE. IN NO EVENT SHALL SELLER'S TOTAL CUMULATIVE LIABILITY FOR ALL CLAIMS FOR DIRECT DAMAGES EVER EXCEED TEN PERCENT OF THE PURCHASE PRICE OF THE EQUIPMENT IN QUESTION (EXCLUDING CLAIMS FOR BREACHES OF THE MECHANICAL WARRANTY), AND IN NO EVENT SHALL SELLER'S TOTAL CUMULATIVE LIABILITY FOR ALL CLAIMS FOR BREACHES OF THE MECHANICAL WARRANTY EVER EXCEED THE PURCHASE PRICE OF THE EQUIPMENT IN QUESTION. SELLER SHALL HAVE NO LIABILITY FOR ANY DAMAGES RESULTING FROM EQUIPMENT NOT MANUFACTURED BY SELLER OR FOR SERVICES NOT PROVIDED BY SELLER AND BUYER'S SOLE REMEDY SHALL BE AGAINST THE MANUFACTURER OR OTHER SERVICE PROVIDER AND SHALL BE LIMITED TO THE REMEDIES CONTAINED IN THE MANUFACTURER'S OR OTHER SERVICE PROVIDER'S WARRANTY. BUYER MUST NOTIFY SELLER OF ANY CLAIM WITHIN 15 DAYS OF THE EVENT GIVING RISE TO SUCH CLAIM OR SUCH CLAIM IS WAIVED. THE LIMITATIONS CONTAINED IN THIS SUBSECTION 6.3 SHALL APPLY REGARDLESS OF WHETHER THE CLAIM FOR DAMAGES IS BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, TORT OR OTHERWISE, AND SHALL APPLY EVEN WHERE SUCH DAMAGES ARE CAUSED, IN WHOLE OR IN PART, BY THE NEGLIGENCE, GROSS NEGLIGENCE OR ACTS AND OMISSIONS OF THE PARTY CLAIMING DAMAGES OR THE PARTY FROM WHOM DAMAGES ARE SOUGHT. AS USED IN THIS

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SECTION, THE TERM "BUYER" AND "SELLER" SHALL INCLUDE NOT ONLY THE PARTY TO THIS AGREEMENT BUT ALSO ALL OF ITS AFFILIATES. THE PROVISIONS GOVERNING DAMAGE LIMITATIONS AND INDEMNITY SET FORTH IN THIS AGREEMENT SHALL SURVIVE EXPIRATION, TERMINATION, OR CANCELLATION OF THIS AGREEMENT.

6.4 Compliance with laws.
Buyer shall comply with all laws, ordinances and regulations relating to the Equipment and all other aspects of Buyer's business and operations, including any applicable licensing, permitting and registration obligations and environmental laws. Buyer agrees to comply with all applicable U.S. export control laws, rules and regulations. Without limiting the foregoing, Buyer agrees that it will not transfer any export controlled item, data or services, to include transfer to foreign persons employed by or associated with, or under contract to Buyer or Buyer's subcontractors or suppliers, without the authority of an export license, agreement or applicable exemption or exception.

7. PROPRIETARY INFORMATION AND CONFIDENTIALITY.
Buyer hereby acknowledges that the technology related to the Equipment constitutes proprietary information belonging exclusively to Seller (the "Proprietary Information"). Buyer hereby covenants that it shall maintain the Proprietary Information in confidence and shall not disclose, or permit any of its employees or agents to disclose, any Proprietary Information to any person, except to Buyer's employees, officers, directors, agents or representatives who are directly involved in the purchase or use of the Equipment and who agree to be bound by the provisions of this Section 7 in the same manner as Buyer, without the prior written consent of Seller. Buyer shall be liable for any breach by any of Buyer's employees, officers, directors, agents or representatives of any of the provisions of this Section 7.

8. RESALE.
If Buyer resells any of the Equipment, Buyer agrees to require the purchaser of the Equipment to be bound by Sections 3, 5, 6, 7 and 8 of this Agreement. Any such purchaser, however, shall not be considered a third-party beneficiary of this Agreement.

9. EXCUSE OF PERFORMANCE.
Seller shall not be liable for any failure or delay in the performance of any of its obligations hereunder caused by circumstances beyond the reasonable control of Seller.

10. MISCELLANEOUS.

10.1 Assignment.
Buyer must receive Seller's prior written consent to assign this Agreement. This Agreement shall be binding on, and inure to the benefit of, the parties and their respective successors and permitted assigns.

10.2 Applicable Laws and Severability.
The laws of the State of Delaware shall govern this Agreement, without regard to its choice of law provisions. The invalidity or unenforceability of any provision of this Agreement under any applicable laws shall not affect the validity or enforceability of any other provision of this Agreement. The State and Federal courts of Delaware shall have exclusive jurisdiction for any claim or dispute relating to this Agreement or the Equipment.

10.3 Entire agreement.
This Agreement, together with the Commercial Proposal and Seller's applicable technical proposal, constitutes the entire agreement between the parties with respect to the subject matter hereof. No provision of any Buyer purchase order or other Buyer document shall alter or add to this Agreement. Any modifications of this Agreement must be in writing, signed by both parties and dated. The waiver

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by either party of any of its rights under this Agreement shall not be construed as constituting a precedent.

10.4 Notices.
While general information regarding this Agreement and the transactions contemplated herein may be exchanged by the parties electronically, the parties expressly agree not to conduct the transactions contemplated by this Agreement by electronic means except for notices as set forth herein. All notices given in connection with this Agreement must be in writing and sent to the party's place of business addresses indicated on the first page of this Agreement (or on the face of this Purchase Order) or any substitute address that the Party may provide to the other by notice hereunder. In the case of Seller, such notice shall be sent to the attention of the Director, Marketing. Notice shall be considered to be given on the date it is sent by prepaid mail or, if otherwise delivered, on the date of delivery.

10.5 Mediation.
Prior to filing a lawsuit, except to prevent the running of any applicable statute of limitations, all claims and disputes regarding this Agreement or the Equipment shall be submitted to non-binding mediation. If the parties cannot agree to a mediator, one will be selected pursuant to American Arbitration Association rules. The mediation shall take place in Delaware.

10.6 Miscellaneous.
Buyer represents that Buyer is contractually free to enter into this Agreement and to perform hereunder and shall indemnify and defend Seller against all damages Seller may suffer if Buyer's representation is not correct. The captions, titles, and headings used in this Agreement are intended for convenience only and shall not be used for purposes of construction or interpretation.

11. FIELD SERVICES.
In addition to the provisions of Section 10 above, the following terms and conditions shall apply only to any Equipment start-up and/or field supervision assistance services ("Services") performed by or on behalf of Seller (if any):

11.1 Fees and Expenses.
Buyer agrees to pay Seller, within 30 days of receipt of Seller's invoice, the following charges for the Services, except as modified by the Commercial Proposal which shall take precedence: (a) (i) Seller's per diem charge specified in the Commercial Proposal per 8-hour man-day, Monday through Friday; (ii) one and a half (1.5) times the pro-rata per diem rate for each hour in excess of 8 hours; and (iii) two (2) times the per diem rate for weekends and holidays, as the case may be, for each Seller technical advisor for each whole or part of a calendar day from the date of departure from Seller's home office up to and including the date of return to Seller's home office; and (b) an amount equal to Seller's other direct expenses, such as travel, living and communication expenses, incurred in connection with such Services.

Standby Time, defined herein as time up to 8 hours per day, during which Seller's representative, during the course of his or her assignment, is available to work but is not working because of circumstances beyond the reasonable control of Seller, including but not limited to weather conditions, but excluding his or her own sickness or injury, shall be billed at the rates above. Daily travel time to and from lodging, as well as time for meals, will be included and billed as part of the workday. International air travel shall be at Business Class level of service. Domestic travel shall be at Coach or Economy Class level of service. The per diem charge may be subject to adjustment by Seller.

The per diem charge does not include any taxes which may now or hereafter be applicable to, or be imposed upon, the Services. Buyer shall pay all such taxes, except Seller's income tax. Buyer agrees

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to pay or reimburse Seller any such taxes which Seller is required to pay or collect or which are required to be withheld by Buyer.

If Buyer's account is not paid in full by the above-referenced payment day, Seller may, at Seller's option, exercise any one or more of the following (in addition to any other remedies available to Buyer): (a) require Buyer, as a condition of continuing to receive Services, to prepay for Services plus a specified part of the past due amounts as specified by Seller; (b) collect from Buyer on any delinquent balance a charge at the rate of one and one-half percent (1.5%) per month or, if less, the maximum rate permitted by law; (c) cease providing any or all of the Services; and/or (d) terminate this Agreement.

11.2 Nondisclosure and Restriction on Use.
Seller and Buyer shall respect the confidentiality of each other's commercial or technical data disclosed to each other during the performance of the Services. Seller's technical data shall only be used for the detailed design, procurement, construction, operation and maintenance of the facilities for which the Services are furnished. Materials marked "Confidential" will be kept confidential by Buyer. Buyer will not copy any Services materials provided by or on behalf of Seller without Seller's prior written approval.

11.3 Responsibilities of Buyer.
Buyer will at all times remain solely responsible for the facilities for which the Services are furnished. Buyer has the sole responsibility for accepting or rejecting Seller's recommendations. Buyer will give Seller access to the facilities where the Services are to be performed by Seller and otherwise cooperate with Seller, as reasonable and appropriate, in connection with the supply of Services under this Agreement.

11.4 Excuse of Performance.
Seller shall not be liable for failure to perform if prevented by circumstances beyond its reasonable control including but not limited to, breakdown, or malfunction of any equipment utilized by Seller in providing the Services.

11.5 Warranty and Liability.
SELLER WARRANTS THAT THE SERVICES WILL BE PERFORMED IN A GOOD AND WORKMANLIKE MANNER. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, AND EXPRESSLY DISCLAIMS ANY WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

Seller will not be liable for, and Buyer hereby agrees to defend, indemnify and hold Seller harmless from and against any and all claims, suits, losses, damages, liabilities, fines, penalties, costs and expenses (including, without limitation, attorneys' fees and court costs) for bodily injury (including death) or property damage arising out of the Services, except to the extent attributable to the gross negligence or willful misconduct of Seller.

SELLER SHALL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES. SELLER'S SOLE LIABILITY AND BUYER'S SOLE REMEDY FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY DAMAGES RESULTING FROM ANY SERVICES PERFORMED BY OR ON BEHALF OF SELLER OR SELLER'S FAILURE TO PERFORM SUCH SERVICES, SHALL BE LIMITED TO, AT SELLER'S OPTION, THE REFUND OF FIFTY PERCENT (50%) OF THE PURCHASE PRICE OF THE SERVICES IN QUESTION OR REPERFORMANCE OF THE SERVICES IN QUESTION. BUYER MUST NOTIFY SELLER OF ANY CLAIM WITHIN 15 DAYS OF THE EVENT GIVING RISE TO SUCH CLAIM OR SUCH CLAIM IS WAIVED. THE LIMITATIONS CONTAINED IN THIS SECTION SHALL APPLY REGARDLESS OF WHETHER THE CLAIM FOR DAMAGES IS

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BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, TORT OR OTHERWISE, AND SHALL APPLY EVEN WHERE SUCH DAMAGES ARE CAUSED IN WHOLE OR IN PART, BY THE NEGLIGENCE, GROSS NEGLIGENCE OR ACTS AND OMISSIONS OF THE PARTY CLAIMING DAMAGES OR THE PARTY FROM WHOM DAMAGES ARE SOUGHT. AS USED IN THIS SECTION, THE TERM "BUYER" AND "SELLER" SHALL INCLUDE NOT ONLY THE PARTY TO THIS AGREEMENT BUT ALSO ALL OF ITS AFFILIATES. THE PROVISIONS GOVERNING DAMAGE LIMITATIONS AND INDEMNITY SET FORTH IN THIS AGREEMENT SHALL SURVIVE EXPIRATION, TERMINATION, OR CANCELLATION OF THIS AGREEMENT.

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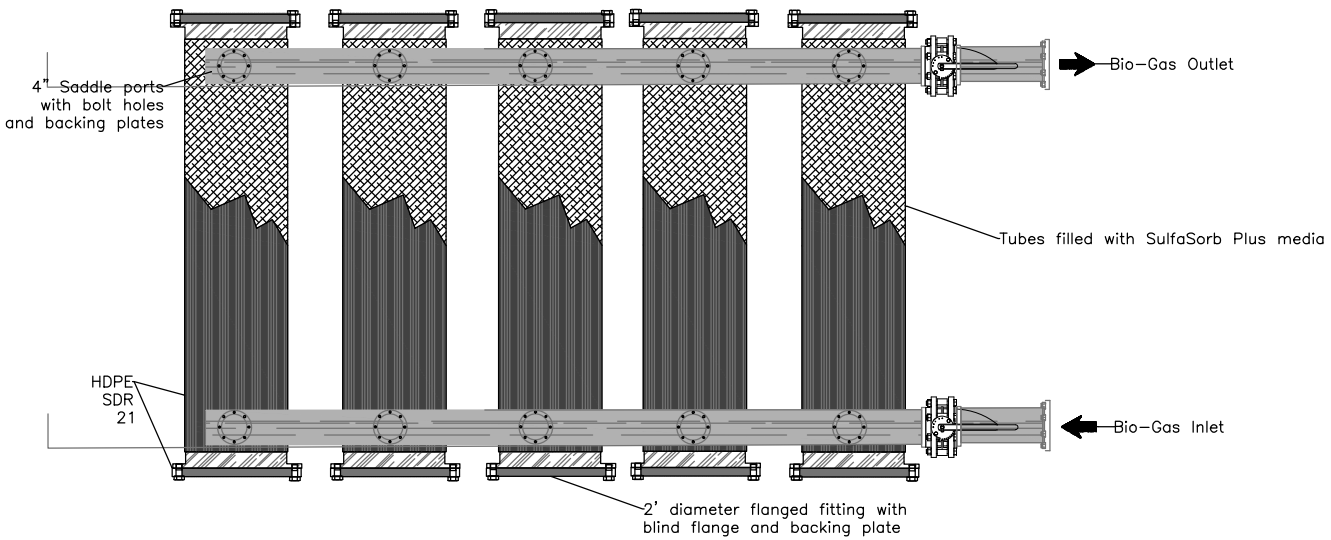

System designed for 400 max SCFM Bio-Gas flow
* 24 Second contact time expected
* 6.2" W.C. Pressure Drop
* C02 does not need to be removed prior to scrubbing or combustion

General Notes

1) Bio-Gas should be dried by passing through moisutre trap process previous to entering scrubber.
2) Media Life expectancy of 173 days based on 250 PPM H2S levels at 400 SCFM bio-gas flow.
3) H2S reduction by use of an air injection system in anerobic digester lagoon reccomended.

No.	Revision/Issue	Date

Firm Name and Address
5 Tube H2S Scrubber system for Bio-Gas applications

Project Name and Address

ELECTRIC INNOVATIONS INC.
1670 Market St. STE 256
REDDING, CA 96001
(530) 222-3366

Project	Sheet
H2S SCRUBBER	1
Date: 9/1/2017	
Scale: N/A	

GAS PROCESSING PLANT

DIGESTER GAS FROM LAGOON DIGESTER

BLOWER SKID

FLASH GAS TO ATMOSPHERE

H_2S REMOVAL

CHILLER / RE-HEATER

D.G. FEED COMPRESSOR

ACTIVATED CARBON VESSELS

WASTE GAS TO ATMOSPHERE

CO_2 MEMBRANE SKID

PRODUCT GAS COMPRESSOR

PRODUCT GAS TO INJECTION PIPELINE

P-103

P-104

P-105

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CONFIDENTIAL INFORMATION

ISSUED FOR REVIEW
(NOT FOR CONSTRUCTION)

SCS ENERGY 3900 KILROY AIRPORT WAY LONG BEACH, CA 90806 (562) 426-9544	CLIENT **MAAS ENERGY WORKS** **3711 MEADOW VIEW DRIVE,** **READING, CA 96002**	SHEET TITLE **PROCESS FLOW DIAGRAM OVERVIEW**	PROJECT DATE: 06/12/18
PROJ. NO. 06218008.00 | DWN. BY: SD | ACAD FILE:		PROJECT TITLE **CALIFORNIA PILOT PROJECTS CONCEPTUAL DESIGN**	SCALE: AS SHOWN
DSN. BY: RS | CHK. BY: RN | APP. BY: RV			DRAWING NO. **P-101**

NO.	REVISION	DATE
1	ISSUED FOR REVIEW	06/12/18

NAME: REGISTRATION DATE: PROFESSIONAL ENGINEER NO.

FEED BLOWER AFTERCOOLER
QTY: 1 AC / 1 FAN
TYPE: FINNED TUBE AIR COOLER
FLUID: DIGESTER GAS
CAPACITY: 2,900 SCFM
RATING: 7.5 HP W/VFD

BLOWER DISCHARGE SEPARATOR
TYPE: VANE WITH MESH
FLUID: DIGESTER GAS
CAPACITY: 2,900 SCFM
SIZE: 30" DIA X 84" S/S
DESIGN: 150 PSIG @ −20 TO 120 F

FEED BLOWERS A/B
TYPE: CENTRIFUGAL
FLUID: DIGESTER GAS
CAPACITY: 1,450 SCFM
SUCTION/DISCHARGE: 0.1/6.2 PSIG
97° F/175° F
MOTOR RATING: 75 HP W/VFD

H2S SCRUBBER
QTY: 1 EACH
FLUID: DIGESTER GAS
CAPACITY: 2,900 SCFM (MAX)
SIZE: XX" DIA x XX' H
INLET H2S CONTENT: 5,000 PPM
MFR: DMT

H2S ACTIVATED CARBON BEDS-A/B
TYPE: PACKED BED
FLUID: DIGESTER GAS
MEDIA: BG1 DARCO – 52,276 LBS
CAPACITY: 2,900 SCFM
SIZE: 8' DIA x 15' (BED DEPTH)
MFR: T.B.D.

LP CHILLER OUTLET SEPARATOR
QTY: 1 EACH
TYPE: VANE VERTICAL
FLUID: DIGESTER GAS
CAPACITY: 2,900 SCFM
SIZE: 30" DIA x 84" S/S
DESIGN: 150 PSIG @ −20 TO 150 F

HP CHILLER OUTLET SEPARATOR
QTY: 1 EACH
TYPE: VANE VERTICAL
FLUID: DIGESTER GAS
CAPACITY: 2,162 SCFM
SIZE: 18 DIA" x 84" S/S
DESIGN: 300 PSIG @ −20 TO 150 F

CHILLER
QTY: 1 EACH
TYPE: SHELL / TUBE FLOODED
FLUID: GLYCOL / DIGESTER GAS
CAPACITY: 1,450 SCFM LP CIRCUIT
2,162 SCFM HP CIRCUIT
SIZE: X" DIA x X" S/S
DESIGN:
SHELL: 150 PSIG/ −20 TO 200 F
TUBE: 300 PSIG/ −20 TO 200 F

BLOWER SUCTION SEPARATOR
TYPE: VANE WITH MESH
FLUID: DIGESTER GAS
CAPACITY: 2,900 SCFM
SIZE: 30" DIA X 84" S/S
DESIGN: 150 PSIG @ −20 TO 120 F

PARTICULATE FILTER
TYPE: CARTRIDGE
MEDIA: DIGESTER GAS
SIZE: X" DIA x X"
DESIGN: 15 PSIG @ 200°F

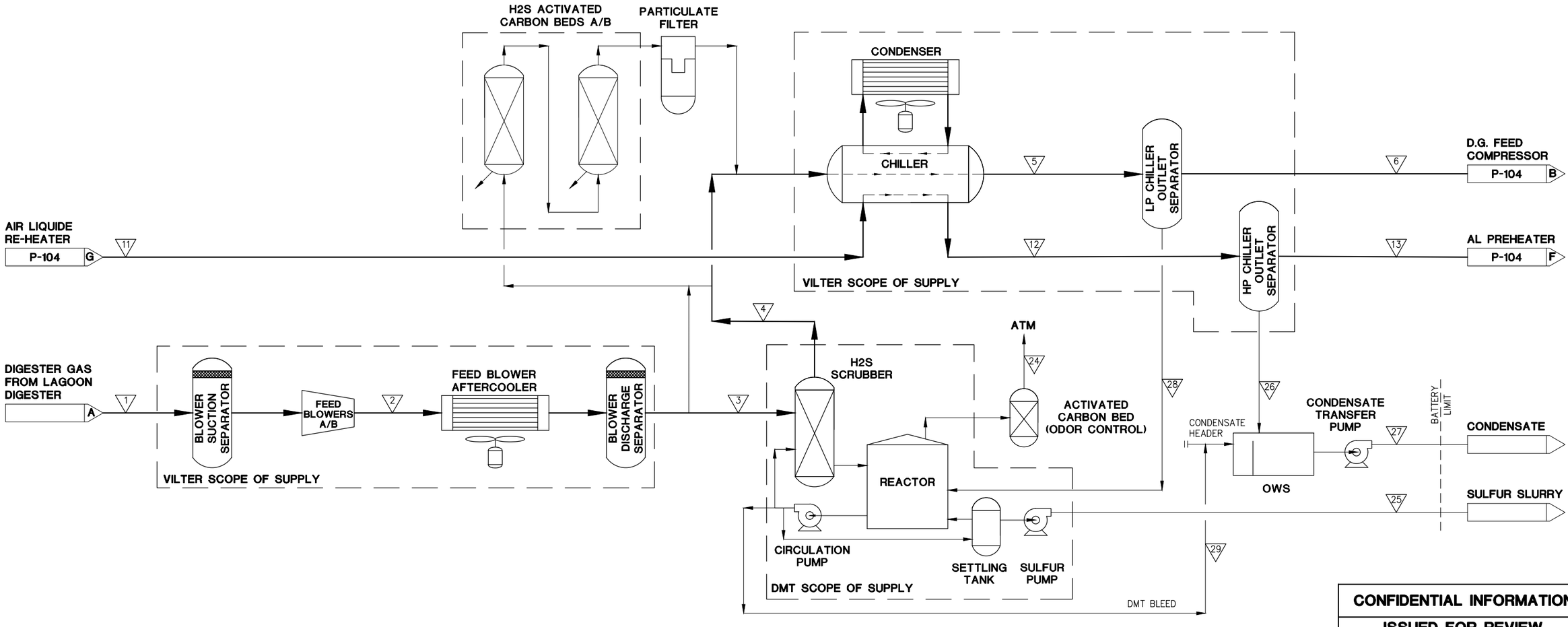
ACTIVATED CARBON BED (ODOR CONTROL)
TYPE: PACKED BED
FLUID: FLASH GAS FROM DMT
MEDIA: ACTIVATED CARBON
CAPACITY: XX SCFM (MAX.)
SIZE: X' DIA x X' BED

CONDENSATE TRANSFER PUMP
TYPE: XX
FLOW: XX GPM
DISCHARGE PRESSURE: XX PSI
MFR.: T.B.D.

CONDENSER
TYPE: SHELL AND TUBE
FLUID: REFRIGERANT, R134A
RATING: 15 HP W/ VFD
HEAT TRANSFER: XXX BTU/HR
DESIGN: 350 PSIG @ 200F

SULFUR PUMP
QTY: 1 EACH
FLUID: SULFUR SLURRY
CAPACITY: XX GPM (MAX)
HEAD: XX PSI

OWS
OIL WATER SEPARATOR
CAPACITY: XX GAL
MFR: T.B.D.
SIZE: X"(W) X X"(L) X X"(H)



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SCS ENERGY	3900 KILROY AIRPORT WAY, LONG BEACH, CA 90806, (562) 426-9544
CLIENT	MAAS ENERGY WORKS, 3711 MEADOW VIEW DRIVE, READING, CA 96002
SHEET TITLE	PROCESS FLOW DIAGRAM, BLOWER, H2S REMOVAL, CHILLER
PROJECT TITLE	CALIFORNIA PILOT PROJECTS, CONCEPTUAL DESIGN
PROJ. NO.	06218008.00
DWN. BY:	SD
CHK. BY:	RN
APP. BY:	RV
ACAD FILE:	
PROJECT DATE:	06/12/18
SCALE:	AS SHOWN
DRAWING NO.	P-103

NO.	REVISION	DATE
A	ISSUED FOR REVIEW	06/12/18

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HIGH PRESSURE AFTERCOOLER

QTY: 1 EACH
TYPE: AIR-COOLED AFTERCOOLER
FLUID: DIGESTER GAS
CAPACITY: 2,162 SCFM
DESIGN: 250 PSIG / -20 TO 150° F
RATING: 10 HP W/VFD
HEAT TRANSFER: XX BTU/HR
CLEAN DP: XX PSI
MFR: TBD

A.L. RE-HEATER

QTY: 1 EACH
TYPE: SHELL AND TUBE
FLUID: DIGESTER GAS
CAPACITY: 2,162 SCFM
SIZE: X" DIA x X" S/S
DESIGN: 300 PSIG @ -20 TO 200 F

ACTIVATED CARBON BEDS-A/B

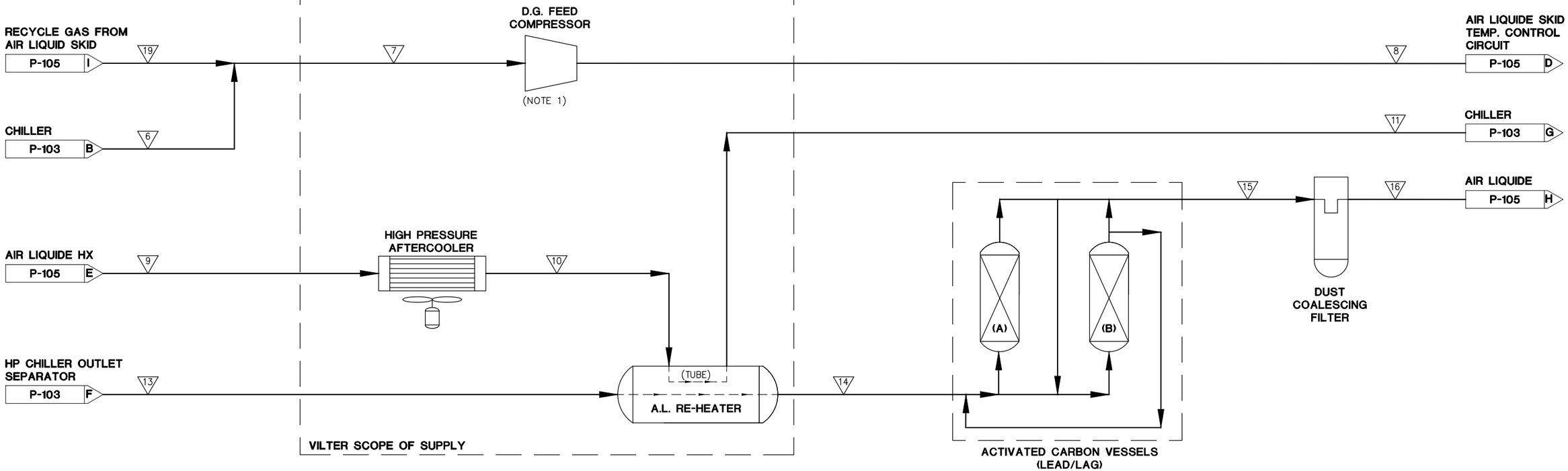
TYPE: NON-REGENERATIVE
FLUID: DIGESTER GAS
MEDIA: ACTIVATED CARBON
SIZE: 50" DIA x 14 S/S
MEDIA: 5,533.2 LBS/EACH
CAPACITY: 2,162 SCFM (TOTAL)

DUST COALESCING FILTER

QTY: 1
MFG: TBD
MODEL: XX
REMOVAL EFF.: 99.99% @ 0.1MICRON
SIZE: X" DIA x X" S/S
DESIGN: 250 PSIG @ 200°F
CLEAN DP: 1 PSI

D.G. FEED COMPRESSOR

QTY: 1 EACH
TYPE: FLOODED SCREW
FLUID: DIGESTER GAS
CAPACITY: 2,162 SCFM
SUCTION/DISCHARGE: 3.2/205 PSIG
53° F/XX° F
MOTOR RATING: 1000 HP



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NOTE:
1. MINIMUM ACCEPTABLE PRESSURE FROM THE COMPRESSOR IS XX PSIG TO AVOID OIL CARRY-OVER.

SCS ENERGY 3900 KILROY AIRPORT WAY LONG BEACH, CA 90806 (562) 426-9544	CLIENT MAAS ENERGY WORKS 3711 MEADOW VIEW DRIVE, READING, CA 96002	SHEET TITLE PROCESS FLOW DIAGRAM ACTIVATED CARBON AND FEED COMPRESSOR	PROJECT DATE: 06/12/18
PROJ. NO. 06218008.00 · DWN. BY: SD · ACAD FILE:		PROJECT TITLE CALIFORNIA PILOT PROJECTS CONCEPTUAL DESIGN	SCALE: AS SHOWN
DSN. BY: SD · CHK. BY: RN · APP. BY: RV			DRAWING NO. P-104

NO.	REVISION	DATE
A	ISSUED FOR REVIEW	06/12/18

NAME: REGISTRATION DATE: PROFESSIONAL ENGINEER REG. NO.

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CO2 SEPARATION SYSTEM

TYPE: AIR LIQUIDE BIOGAS
FLUID: DIGESTER GAS, PRODUCT GAS, RECYCLE GAS & WASTE GAS
CH4 RECOVERY: 97.4%

PRODUCT GAS COMPRESSOR

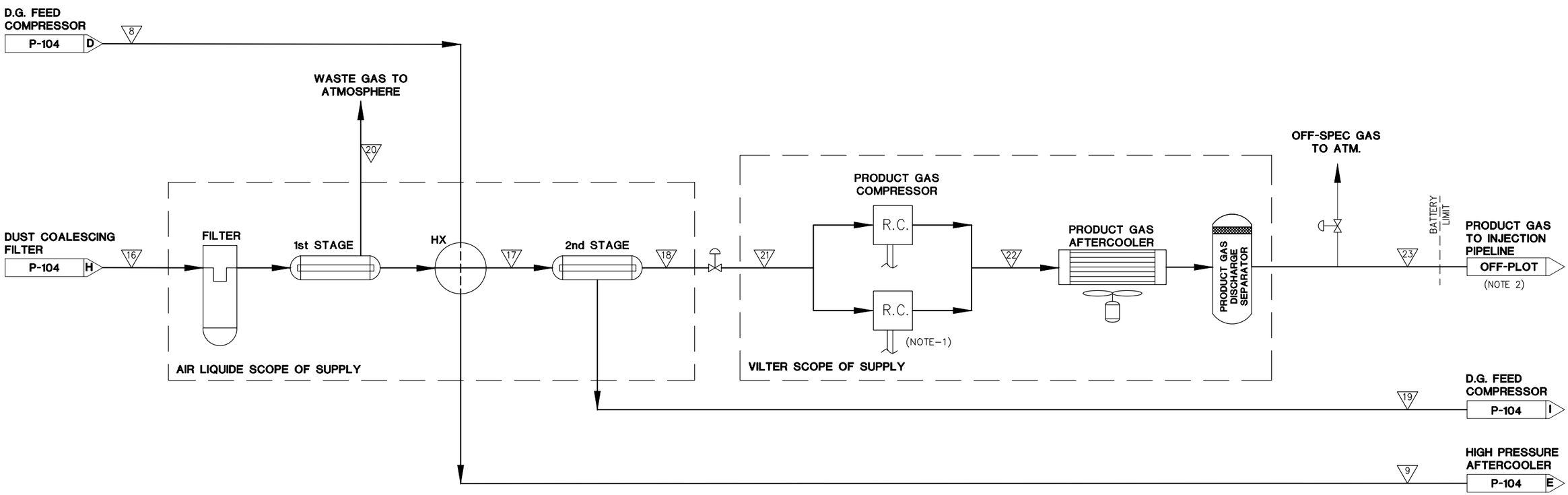
QTY: 1 EACH
TYPE: RECIPROCATING
FLUID: PRODUCT GAS
CAPACITY: 767 SCFM
SUCTION/DISCHARGE: 130/1000 PSIG
60/260 °F
MOTOR RATING: 150 HP W/VFD

PRODUCT GAS AFTERCOOLER

QTY: 1 EACH
TYPE: FINNED TUBE AIR COOLED
FLUID: PRODUCT GAS
RATING: 5 HP FAN W/VFD
CAPACITY: 767 SCFM
DESIGN: XX PSIG @ XX TO XX °F
HEAT TRANSFER: XX BTU/HR
CLEAN DP: XX PSI

PRODUCT GAS DISCHARGE SEPARATOR

QTY: 1 EACH
TYPE: COALESCING
FLUID: PRODUCT GAS
CAPACITY: 767 SCFM
SIZE: 16" DIA x 96" S/S
DESIGN: XX PSIG @ –XX TO XX F



NOTE:
1. MINIMUM ACCEPTABLE PRESSURE FROM THE COMPRESSOR IS XX PSIG TO AVOID OIL CARRY–OVER.

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SCS ENERGY 3900 KILROY AIRPORT WAY LONG BEACH, CA 90806 (562) 426–9544	CLIENT **MAAS ENERGY WORKS** **3711 MEADOW VIEW DRIVE,** **READING, CA 96002**	SHEET TITLE **PROCESS FLOW DIAGRAM** **CO2 MEMBRANE, SALES GAS COMPRESSOR** PROJECT TITLE **CALIFORNIA PILOT PROJECTS** **CONCEPTUAL DESIGN**	NO. / REVISION / DATE A / ISSUED FOR REVIEW / 06/12/18 PROJECT DATE: 06/12/18 SCALE: AS SHOWN DRAWING NO. **P-105**

PROJ. NO. 06218008.00 | DWN. BY: SD | ACAD FILE:
DSN. BY: RN | CHK. BY: RN | APP. BY: RV

REGISTRATION DATE:
NAME:
PROFESSIONAL ENGINEER
REG. NO.

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SAFETY DATA SHEET

1. Identification of the substance or mixture and of the supplier

Product identifier

Product name: **VILTER 717 (2939 Series Part Numbers)**

Additional identification

Chemical name: Mixture

CAS-No.: Not applicable.

Recommended use and restriction on use

Recommended use: Not determined.

Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Supplier

Company Name:	Vilter Manufacturing LLC
Address:	5555 S Packard Avenue Cudahy, WI 53110 US
Telephone:	414-744-0111

Emergency telephone number:
FOR TRANSPORT EMERGENCY CALL CHEMTREC (+1)703 527 3887, OR WITHIN USA 800 424 9300 (LUBRIZOL)

2. Hazards Identification

Classification of the substance or mixture

Prepared according to Global Harmonized System (GHS) standards.

Not classified

Label Elements: Not Applicable.

Other hazards which do not result in GHS classification: None identified.

3. Composition/Information on Ingredients

Mixtures

General information: No hazardous ingredients.

4. First aid measures

Description of first aid measures

Inhalation: Remove exposed person to fresh air if adverse effects are observed.

Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.

Skin Contact: Wash with soap and water. Get medical attention if symptoms occur. Launder contaminated clothing before reuse.

Ingestion: Treat symptomatically. Get medical attention.

Most important symptoms and effects, both acute and delayed: See section 11.

Indication of any immediate medical attention and special treatment needed

Treatment: Treat symptomatically.

5. Fire-fighting measures

General Fire Hazards: No unusual fire or explosion hazards noted.

Extinguishing media

Suitable extinguishing media: CO2, Dry chemical or Foam. Water can be used to cool and protect exposed material.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazard arising from the chemical: A solid stream of water will spread the burning material. Material creates a special hazard because it floats on water. See section 10 for additional information.

Advice for firefighters

Special fire fighting procedures: No data available.

Special protective equipment for fire-fighters: Recommend wearing self-contained breathing apparatus.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations.

Environmental Precautions: Avoid release to the environment. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages. Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up: Dike far ahead of larger spill for later recovery and disposal. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

Reference to other sections: See sections 8 and 13 for additional information.

7. Handling and Storage:

Precautions for safe handling: Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or grounding procedures. Use grounding and bonding connection when transferring material. In case of spills, beware of slippery floors and surfaces.
Observe good industrial hygiene practices. Provide adequate ventilation. Wear appropriate personal protective equipment.

Maximum Handling Temperature: Not determined.

Conditions for safe storage, including any incompatibilities: Store away from incompatible materials. See section 10 for incompatible materials.

Maximum Storage Temperature: Not determined.

8. Exposure Controls/Personal Protection

Control Parameters:

Occupational Exposure Limits

Chemical name	type	Exposure Limit Values	Source
Mineral oil - Inhalable fraction.	TWA	5 mg/m3	US. ACGIH Threshold Limit Values (03 2014)
Mineral oil - Inhalable fraction.	TWA	5 mg/m3	US. ACGIH Threshold Limit Values (02 2012)
Mineral oil - Inhalable fraction.	TWA	5 mg/m3	US. ACGIH Threshold Limit Values (03 2014)

Appropriate engineering controls: No special requirements under ordinary conditions of use and with adequate ventilation.

Individual protection measures, such as personal protective equipment

General information: Use personal protective equipment as required.

Eye/face protection: If contact is likely, safety glasses with side shields are recommended.

Skin protection

Hand Protection: Nitrile. Use nitrile or neoprene gloves. Use good industrial hygiene practices. In case of skin contact, wash hands and arms with soap and water.

Other: No data available.

Respiratory Protection: Use disposable dust/mist mask if the recommended exposure limit is exceeded. Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator.

Hygiene measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Color:	Colorless to yellow
Odor:	Mild
Odor Threshold:	No data available.
pH:	No data available.
Freezing point:	No data available.
Boiling Point:	No data available.
Flash Point:	226 °C (Cleveland Open Cup)
Evaporation Rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability Limit - Upper (%):	No data available.
Flammability Limit - Lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density (air=1):	No data available.
Relative density:	0,867 (15,6 °C)
Solubility(ies)	
Solubility in Water:	Insoluble in water
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Autoignition Temperature:	246 °C
Decomposition Temperature:	No data available.
Viscosity:	69 mm2/s (40 °C); 9,1 mm2/s (100 °C)
Explosive properties:	No data available.
Oxidizing properties:	No data available.
Pour Point Temperature	No data available.

Other information

Bulk density:	7,4 lb/gal (25 °C)

10. Stability and Reactivity

Reactivity:	No data available.
Chemical Stability:	Material is stable under normal conditions.
Possibility of Hazardous Reactions:	Will not occur.
Conditions to Avoid:	Do not expose to excessive heat, ignition sources, or oxidizing materials.
Incompatible Materials:	Strong acids. Oxidizing agents.
Hazardous Decomposition Products:	Thermal decomposition or combustion may generate smoke, carbon monoxide, carbon dioxide, and other products of incomplete combustion.

11. Toxicological Information

Information on likely routes of exposure

Inhalation: No data available.

Ingestion: No data available.

Skin Contact: No data available.

Eye contact: No data available.

Information on toxicological effects

Acute toxicity

Oral
Product: Not classified for acute toxicity based on available data.

Dermal
Product: Not classified for acute toxicity based on available data.

Inhalation
Product: Not classified for acute toxicity based on available data.

Skin Corrosion/Irritation:
Product: Prolonged or repeated skin contact as from clothing wet with material may cause dermatitis. Symptoms may include redness, edema, drying, and cracking of the skin.
Remarks: Not classified as a primary skin irritant.

Serious Eye Damage/Eye Irritation:
Product: Remarks: Not classified as a primary eye irritant.

Respiratory sensitization:
No data available

Skin sensitization:
No data available

Specific Target Organ Toxicity - Single Exposure:
No data available

Aspiration Hazard:
No data available

Chronic Effects

Carcinogenicity:
Product: This product contains mineral oils which are severely refined and not considered carcinogenic. All of the oils in this product have been demonstrated to contain less than 3% extractables by the IP 346 test.

Germ Cell Mutagenicity:
No data available

Reproductive toxicity:
No data available

Specific Target Organ Toxicity - Repeated Exposure:
No data available

12. Ecological Information

Ecotoxicity

Fish
No data available

Aquatic Invertebrates
No data available

Toxicity to Aquatic Plants
No data available

Toxicity to soil dwelling organisms
No data available

Sediment Toxicity
No data available

Toxicity to Terrestrial Plants
No data available

Toxicity to Above-Ground Organisms
No data available

Toxicity to microorganisms
No data available

Persistence and Degradability

Biodegradation
No data available

Bioaccumulative Potential

Bioconcentration Factor (BCF)
No data available

Partition Coefficient n-octanol / water (log Kow)
No data available

Mobility:
No data available

Other Adverse Effects: No data available.

13. Disposal Considerations

Disposal methods: Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.
Since emptied containers retain product residue, follow label warnings even after container is emptied.

Contaminated Packaging: Container packaging may exhibit hazards.

14. Transport Information

IATA
Not regulated.

ADR
Not regulated.

International standards

IMDG
Not regulated.

Code of Emergency Measure:
Domestic Standard: In compliance with domestic law.
Environmental hazards: Not regulated.

Special precautions for user: No special precautions.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
None known.

Shipping descriptions may vary based on mode of transport, quantities ,temperature of the material, package size, and/or origin and destination It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material. For transportation, steps must be taken to prevent load shifting or materials falling, and all relating legal statutes should be obeyed. Review classification requirements before shipping materials at elevated temperatures.

15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.:

Inventory Status

Australia (AICS)
All components are in compliance with chemical notification requirements in Australia.

Canada (DSL/NDSL)
All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.

China (IECSC)
All components of this product are listed on the Inventory of Existing Chemical Substances in China.

European Union (REACh)
To obtain information on the REACH compliance status of this product, please visit Lubrizol.com/REACH, or e-mail us at REACH_MSDS_INQUIRIES@Lubrizol.com

Japan (ENCS)
All components are in compliance with the Chemical Substances Control Law of Japan.

Korea (ECL)
All components are in compliance in Korea.

New Zealand (NZIoC)
All components are in compliance with chemical notification requirements in New Zealand.

Philippines (PICCS)
All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

Switzerland (SWISS)
All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Taiwan (TCSCA)
All components of this product are listed on the Taiwan inventory.

United States (TSCA)
All components of this material are on the US TSCA Inventory.

The information that was used to confirm the compliance status of this product may deviate from the chemical information shown in Section 3.

16. Other Information

Key literature references and sources for data: Internal company data and other publically available resources.

HMIS Hazard ID

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date: 07.03.2015

Disclaimer: As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

GENERAL CARBON CORP.

SAFETY DATA SHEET

Section 1 - Identity

Identity (As Used on Label and List): GC Activated Carbon (Including, but not limited to GC C-40, GC 4 x 8B, GC 4 x 8S, GC 6 x 12, GC 6 x 12S, GC 8 x 30, GC 8 x 30AW, GC 8 x 30S, GC 8 x 30SAW, GC 12 x 40, GC 12 x 40AW, GC 12x40SAW, GC 20 x 50, GC 20 x 50S, GC Powdered, GC WDC activated carbons)

Manufacturers Name: General Carbon Corporation
33 Paterson Street
Paterson, NJ 07501
Tel: (973)523-2223
www.generalcarbon.com
Date Prepared: February 16, 2017

Section 2 - Hazardous Identification

2.1 GHS-US Classification

Eye Irritation	2B H320
STOT	SE 3 H335

Hazards not otherwise classified: Combustible dust. May form combustible dust concentrations in air. All powdered activated carbons are classified as weakly explosive (Dust explosion class St1): Given the necessary conditions of a strong ignition source, right concentrations of airborne carbon dust, adequate oxygen levels, and confinement, the potential for a deflagration event exists. A combustible dust hazard assessment and employee training should be carried out. See sections 7 and 9 for further information on combustible dust precautions.

2.2 Label Elements

Hazard Pictograms

Signal word (GHS-US)	: Warning
Hazard Statements	: H320- Causes eye irritation
	: H335- May cause respiratory irritation
Precautionary statements (GHS-US)	: P261- Avoid breathing dust
	: P264- Wash thoroughly after handling
	: P271- Use in well-ventilated area
	: P280- Wear protective gloves/clothing/eye & face protect
	: P304&340: IF INHALED: Remove person to fresh air

: P305&351&P338: If in eyes, Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.
: P312- Call Poison Control Center/Doctor if you feel sick
: P403& P233- Store in well-ventilated place. Keep container tightly closed
: P405- Store locked up
: P501- Dispose of container to appropriate receptacle

2.3 Other Hazards

No additional information available

2.4 Unknown acute toxicity (GHS-US)

No data available

Section 3: Composition/information on ingredients

3.1 Substances

Not applicable

3.2 Mixture

Name	CAS #	%	GHS_US classification
Carbon	7440-44-0	100	Not classified

Section 4 – First Aid Measures

4.1 Description of first aid measures

First aid after inhalation	Remove person to fresh air. If not breathing, administer CPR or artificial respiration. Get immediate medical attention.
First aid after skin contact	If skin reddening or irritation develops, seek medical attention
First aid after eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. If irritation persists, get medical attention.
First aid after ingestion	If the material is swallowed, get immediate medical attention or advice. DO NOT induce vomiting unless directed to do so by medical personnel.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation	May cause respiratory irritation
Symptoms/injuries after skin contact	May cause skin irritation
Symptoms/injuries after eye contact	Causes serious eye damage
Symptoms/injuries after ingestion	May be harmful is swallowed

4.3 Indication of any immediate medical attention and special treatment needed

No additional information available.

Section 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	If involved with fire, flood with plenty of water
Unsuitable extinguishing media	None

5.2 Special hazards arising from substance or mixture

Fire hazard	None known
Explosion hazard	None known
Reactivity	Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, etc. may result in fire.

5.3 Advice for firefighters

Protection during firefighting	Firefighters should wear full protective gear

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

General measures	Avoid contact with the skin and eyes

6.1.1 For non-emergency personnel

No additional information available

6.1.2 For emergency responders

No additional information available

6.2 Environmental precautions

None

6.3 Methods and material for containment and cleaning up

For containment	If possible, stop flow of product
Methods for cleaning up	Shovel or sweep up and put in closed container for disposal

6.4 Reference to other sections

No additional information available

Section 7: Handling and storage

7.1 Precautions for safe handling

Precautions for safe handling	Avoid contact with eyes. Wet activated carbon removes oxygen from air causing severe hazard to workers inside carbon vessels or confined spaces

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions	Protect containers from physical damage. Store in dry, cool, well-ventilated area. Store away from strong oxidizers, strong acids, ignition sources, combustible materials, and heat. An adequate air gap between packages is recommended to reduce propagation in the case of fire **.**

Handling: A hazard assessment should be carried out. As with all finely divided materials, ground all transfer, blending, and dust collecting equipment to prevent static discharge. Remove all strong ignition sources from material handling, transfer, and processing areas where dust may be present or accumulate. Practice good housekeeping. Excessive accumulations of dust or dusty conditions can create the potential of secondary explosions. Inspection of hidden surfaces for dust accumulation should be made routinely. If possible, eliminate the pathways for dust to accumulate in hidden areas. Fine carbon dust may penetrate electrical equipment and cause electrical shorts. Where dusting is unavoidable, dust-proof boxes and regular electrical line maintenance are recommended. Refer to NFPA standards 654 for guidance.

Caution employees-no smoking in carbon storage and handling areas. Carbon is difficult to ignite, however, cutting and welding operations should be carried out using hot work permit systems where precautions are taken not to ignite carbon, which may smolder undetected.

7.3 Specific end use(s)

No additional information available

Section 8: Exposure controls/ personal protection

8.1 Control parameters

No additional information available

8.2 Exposure controls

Appropriate engineering controls	: Local exhaust and general ventilation must be adequate to meet exposure standards
Hand Protection	: None required under normal product handling conditions
Eye Protection	: safety glasses
Skin and body protection	: Wear suitable working clothes
Respiratory protection	: If airborne concentrations are above the applicable exposure limits, use NIOSH approved respiratory protection

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Particulate
Color	: Black
Odor	: No data available
Odor threshold	: No data available
Ph	: No data available
Relative evaporation rate	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor Pressure	: No data available
Relative Vapor density @ 20 deg C	: No data available
Relative Density	: 28-33 lb/ cubic foot
Solubility	: No data available
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosive limits	: No data available

Combustible dust- These products may contain combustible dusts. May form combustible dust concentrations in air. All powdered activated carbons are weakly explosive. No specific information on these carbons are available.
Typical combustible dust data for a variety of activated carbons:
K_{st} values reported between 43-113 (various sources).
Dust explosion class St1 (K_{st} values < 200 are Class St1-weakly explosive).
MEC (minimum explosible concentration) in air 50 and 60 g/m^3 (two reports)
Volatile content (by weight): < 8% ASTM D3175-11 (Watercarb)
MIT (minimum ignition temperature) values reported between 400-680°C (752-1256°F) (four reports)
Maximum Absolute Explosion pressure values reported between 6.0-8.6 bar (four reports)

9.2 Other information
No additional information available

Section 10: Stability and reactivity

10.1 Reactivity
Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, etc. may result in fire

10.2 Chemical stability
Stable under normal conditions

10.3 Possibility of hazardous reactions
Will not occur

10.4 Conditions to avoid
None

10.5 Incompatible materials
Strong oxidizing and reducing agents such as ozone, liquid oxygen or chlorine.

10.6 Hazardous decomposition products
Carbon monoxide may be generated in the event of a fire.

Section 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity : Not classified

Carbon (7440-44-0)
LD50 oral rat : >10000 mg/kg
Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Causes eye irritation
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
Specific target organ toxicity : May cause respiratory irritation (single exposure)
Specific target organ toxicity : Not classified (repeated exposure)
Aspiration hazard : Not classified

Section 12: Ecological Information

12.1 Toxicity
No additional information available

12.2 Persistence and degradability
No additional information available

12.3 Bioaccumulative potential
No additional information available

12.4 Mobility in soil
No additional information available

12.5 Other adverse effects

No additional information available

Section 13: Disposal concerns

13.1 Waste treatment methods

Waste Disposal recommendations : Dispose of contents/container in accordance with local/ regional/ international regulations

Section 14: Transportation information

In accordance with DOT/ADR/RID/ADNR/IMDG/ICAO/IATA

14.1 UN Number

Not applicable. See Note 1 below.

14.2 UN proper shipping name

Not applicable

Note 1: Under the UN classification for activated carbon, all activated carbons have been identified as a class 4.2 product. However, This product has been tested according to the United Nations Transport of Dangerous Goods test protocol for a "self-heating substance" (United Nations Transportation of Dangerous Goods, Manual of Tests and Criteria, Part III, Section 33.3.1.6 - Test N.4 - Test Method for Self Heating Substances) and it has been specifically determined that this product does not meet the definition of a self heating substance (class 4.2) or any other hazard class, and therefore should not be listed as a hazardous material. This information is applicable only for the Activated Carbon Product identified in this document.

Section 15: Regulatory information

15.1 US Federal regulations

Carbon (7440-44-0)

Listed on the United States TSCA inventory

15.3 US State regulations

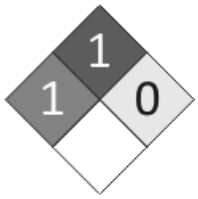
No additional information available

Section 16: Other information

Full text of H-phrases:

Eye Irrit. 2B	Serious eye damage/eye irritation Category 2B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H335	May cause respiratory irritation

NFPA®



NFPA health hazard : 1-Exposure could cause irritation but only minor residual injury even if no treatment is given

NFPA fire hazard : 1- Materials that require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur (e.g. mineral oil). Includes some finely divided suspended solids that do not require heating before ignition can occur. Flash point at or above 93.3 °C (200 °F)

NFPA reactivity : 0- Normally stable, even under fire exposure conditions, and are not reactive with water

*******The information contained herein is accurate to the best of our knowledge. General Carbon Corporation makes no warranty with respect hereto said information and disclaims all liability from reliance there in.***

June 11, 2018
File No. 90000011.06

Maas Energy Works Inc.
3711 Meadow View Dr., Suite 100
Redding, CA 96002

Subject: Lakeside Pipeline Dairy Digester Cluster Project
Letter of Commitment

To Whom It May Concern:

The purpose of this letter is to document SCS Engineers commitment to the Lakeside Pipeline Dairy Digester Cluster Project planned by Lakeside Pipeline LLC in Hanford County and Tulare County.

Our role in the project would be the design-build contractor for the biogas conditioning and cleanup facility that will be located 1,600 feet North of the intersection of 7th Ave and Jersey Ave in Hanford, CA. Our firm would be responsible for designing a system sized to process up to 1,887 SCFM of raw biogas and deliver it to the utility pipeline meeting all SoCal Gas Rule 30 requirements. As design-build contractor, we will provide the design, full construction, commissioning, and post-commissioning support though operational and maintenance.

After design-build contract execution, we will provide stamped construction drawings to all sub-contractors and permitting agencies, and will supply as-built drawings upon completion. We are prepared to facilitate project development immediately.

Sincerely,

Jeffrey L. Pierce, P.E.
Senior Project Director
SCS Energy

Air Liquide

June 15, 2018

Mr. Daryl Maas
Maas Energy Works
3711 Meadow View Drive, Suite 100
Redding, CA 96002

Subject: SB 1383 Dairy Pilot Projects Program
Grant Application

Dear Mr Maas:

Maas Energy has informed Air Liquide Advanced Technology (AL) that they intend to use AL as the equipment supplier for carbon dioxide and oxygen separation for their three proposed dairy cluster projects in response to the above referenced grant solicitation. As you know, AL employs membrane technology. AL would manufacture the membrane skids for these projects in the United States. AL currently has more than 30 membrane units operating on biogas, which produce renewable natural gas (RNG). AL's parent company, Air Liquide, is a $20 billion+ international company. As in the past, AL is prepared to guarantee the performance of its equipment.

AL provides a guarantee for product gas carbon dioxide content and for percent methane recovery on a project specific basis, and would do so on your individual project, per AL's usual terms and conditions.

AL supports Maas Energy in its grant application, and sees these projects as prototypes for many similar projects in California. If you have any questions about our support, you may contact me at Thomas.kappelmeier@airliquide.com or 302-250-0888.

Sincerely,

Thomas Kappelmeier
Director, Clean Energy Solutions

Air Liquide Advanced Technologies U.S. LLC
305 Water Street • Newport, DE 19804 • USA- Phone (302) 225-1100- FAX (302) 225-0412

Base Contract for Sale and Purchase of Natural Gas

This Base Contract is entered into as of the following date: February 21, 2018

The parties to this Base Contract are the following:

PARTY A Lakeside Pipeline, LLC	PARTY NAME	PARTY B Clean Energy Renewable Fuels, LLC
3711 Meadow View Dr. Ste 100 Redding, CA 96002	ADDRESS	4675 MacArthur Court, Suite 800 Newport Beach, CA 92660
www.MaasEnergy.com	BUSINESS WEBSITE	www.cleanenergyfuels.com
	CONTRACT NUMBER	
	D-U-N-S® NUMBER	
☒ US FEDERAL: 36-4885960 ☐ OTHER:	TAX ID NUMBERS	☒ US FEDERAL: 95-4603747 ☐ OTHER:
	JURISDICTION OF ORGANIZATION	
☐ Corporation ☒ LLC ☐ Limited Partnership ☐ Partnership ☐ LLP ☐ Other:	COMPANY TYPE	☐ Corporation ☒ LLC ☐ Limited Partnership ☐ Partnership ☐ LLP ☐ Other:
	GUARANTOR (IF APPLICABLE)	

CONTACT INFORMATION

Maas Energy Works, Inc. ATTN: Daryl Maas TEL#: 210-527-7631 FAX#: (855) 639-4608 EMAIL: daryl@maasenergy.com	• COMMERCIAL	~~Clean Energy Renewable Fuels, LLC~~ ATTN: ~~Tyler Henn~~ TEL#: (949) 437-1258 EMAIL: tyler.henn@cleanenergyfuels.com
~~Maas Energy Works, Inc.~~ ATTN: Daryl Maas TEL#: 210-527-7631 FAX#: (855) 639-4608 EMAIL: daryl@maasenergy.com	• SCHEDULING	~~Clean Energy Renewable Fuels, LLC~~ ATTN: Tyler Henn TEL#: (949) 437-1258 EMAIL: tyler.henn@cleanenergyfuels.com
~~Maas Energy Works, Inc.~~ ATTN: Daryl Maas TEL#: 210-527-7631 FAX#: (855) 639-4608 EMAIL: daryl@maasenergy.com	• CONTRACT AND LEGAL NOTICES	~~Clean Energy Renewable Fuels, LLC~~ ATTN: ~~Tyler Henn~~ TEL#: (949) 437-1258 EMAIL: tyler.henn@cleanenergyfuels.com
~~Maas Energy Works, Inc.~~ ATTN: Daryl Maas TEL#: 210-527-7631 FAX#: (855) 639-4608 EMAIL: daryl@maasenergy.com	• CREDIT	~~Clean Energy Renewable Fuels, LLC~~ ATTN: Tyler Henn TEL#: (949) 437-1258 EMAIL: tyler.henn@cleanenergyfuels.com
~~Maas Energy Works, Inc.~~ ATTN: ~~Daryl Maas~~ TEL#: 210-527-7631 FAX#: (855) 639-4608 EMAIL: daryl@maasenergy.com	• TRANSACTION CONFIRMATIONS	~~Clean Energy Renewable Fuels, LLC~~ ATTN: ~~Tyler Henn~~ TEL#: (949) 437-1258 EMAIL: tyler.henn@cleanenergyfuels.com

ACCOUNTING INFORMATION

Maas Energy Works, Inc. ATTN: Stephen Hatley TEL#: 512-618-2987 FAX#: (855) 639-4608 EMAIL: Stephen@maasenergy.com	• INVOICES • PAYMENTS • SETTLEMENTS	Clean Energy Renewable Fuels, LLC ATTN: Tyler Henn TEL#: (949) 437-1258 EMAIL: tyler.henn@cleanenergyfuels.com
BANK: ABA: ACCT: OTHER DETAILS:	WIRE TRANSFER NUMBERS (IF APPLICABLE)	BANK: ABA: ACCT: OTHER DETAILS:
BANK: ABA: ACCT: OTHER DETAILS:	ACH NUMBERS (IF APPLICABLE)	BANK: ABA: ACCT: OTHER DETAILS:
ATTN: ADDRESS:	CHECKS (IF APPLICABLE)	ATTN: ADDRESS:

NAESB Standard 6.3.1
September 5, 2006

ID #_____

(CE rev. 08.01.2014)

Base Contract for Sale and Purchase of Natural Gas

(Continued)

This Base Contract incorporates by reference for all purposes the General Terms and Conditions for Sale and Purchase of Natural Gas published by the North American Energy Standards Board. The parties hereby agree to the following provisions offered in said General Terms and Conditions. In the event the parties fail to check a box, the specified default provision shall apply. Select the appropriate box(es) from each section:

Section 1.2 Transaction Procedure
☐ Oral (default)
OR
☒ Written

Section 2.7 Confirm Deadline
☒ 2 Business Days after receipt (default)
OR
☐ 5 Business Days after receipt

Section 2.8 Confirming Party
☒ Seller (default)
OR
☐ Buyer _____

Section 3.2 Performance Obligation
☒ Cover Standard (default)
OR
☐ Spot Price Standard

Note: The following Spot Price Publication applies to both of the immediately preceding.

Section 2.31 Spot Price Publication
☒ Gas Daily Midpoint (default)
OR
☐ _____

Section 6 Taxes
☒ Buyer Pays At and After Delivery Point (default)
OR
☐ Seller Pays Before and At Delivery Point

Section 7.2 Payment Date
☒ 25th Day of Month following Month of delivery (default)
OR
☐ Day of Month following Month of delivery

Section 7.2 Method of Payment
☒ Wire transfer (default)
☐ Automated Clearinghouse Credit (ACH)
☐ Check

Section 7.7 Netting
☒ Netting applies (default)
OR
☐ Netting does not apply

Section 10.2 Additional Events of Default
☒ No Additional Events of Default (default)
☐ Indebtedness Cross Default
- ☐ Party A: _____
- ☐ Party B: _____

☐ Transactional Cross Default
Specified Transactions:
_____
_____

Section 10.3.1 Early Termination Damages
☒ Early Termination Damages Apply (default)
OR
☐ Early Termination Damages Do Not Apply

Section 10.3.2 Other Agreement Setoffs
☒ Other Agreement Setoffs Apply (default)
- ☒ Bilateral (default)
- ☐ Triangular

OR
☐ Other Agreement Setoffs Do Not Apply

Section 15.5 Choice Of Law California

Section 15.10 Confidentiality
☒ Confidentiality applies (default)
OR
☐ Confidentiality does not apply

☐ **Special Provisions** Number of sheets attached:
☐ **Addendum(s):** _____

IN WITNESS WHEREOF, the parties hereto have executed this Base Contract in duplicate.

	PARTY NAME	Clean Energy Renewable Fuels, LLC
By: Lakeside Pipeline LLC	SIGNATURE	By:
Daryl Maas	PRINTED NAME	TYLER HENN
Manager	TITLE	VICE PRESIDENT

General Terms and Conditions
Base Contract for Sale and Purchase of Natural Gas

SECTION 1. PURPOSE AND PROCEDURES

1.1. These General Terms and Conditions are intended to facilitate purchase and sale transactions of Gas on a Firm or Interruptible basis. "Buyer" refers to the party receiving Gas and "Seller" refers to the party delivering Gas. The entire agreement between the parties shall be the Contract as defined in Section 2.9.

The parties have selected either the "Oral Transaction Procedure" or the "Written Transaction Procedure" as indicated on the Base Contract.

Oral Transaction Procedure:

1.2. The parties will use the following Transaction Confirmation procedure. Any Gas purchase and sale transaction may be effectuated in an EDI transmission or telephone conversation with the offer and acceptance constituting the agreement of the parties. The parties shall be legally bound from the time they so agree to transaction terms and may each rely thereon. Any such transaction shall be considered a "writing" and to have been "signed". Notwithstanding the foregoing sentence, the parties agree that Confirming Party shall, and the other party may, confirm a telephonic transaction by sending the other party a Transaction Confirmation by facsimile, EDI or mutually agreeable electronic means within three Business Days of a transaction covered by this Section 1.2 (Oral Transaction Procedure) provided that the failure to send a Transaction Confirmation shall not invalidate the oral agreement of the parties. Confirming Party adopts its confirming letterhead, or the like, as its signature on any Transaction Confirmation as the identification and authentication of Confirming Party. If the Transaction Confirmation contains any provisions other than those relating to the commercial terms of the transaction (i.e., price, quantity, performance obligation, delivery point, period of delivery and/or transportation conditions), which modify or supplement the Base Contract or General Terms and Conditions of this Contract (e.g., arbitration or additional representations and warranties), such provisions shall not be deemed to be accepted pursuant to Section 1.3 but must be expressly agreed to by both parties; provided that the foregoing shall not invalidate any transaction agreed to by the parties.

Written Transaction Procedure:

1.2. The parties will use the following Transaction Confirmation procedure. Should the parties come to an agreement regarding a Gas purchase and sale transaction for a particular Delivery Period, the Confirming Party shall, and the other party may, record that agreement on a Transaction Confirmation and communicate such Transaction Confirmation by facsimile, EDI or mutually agreeable electronic means, to the other party by the close of the Business Day following the date of agreement. The parties acknowledge that their agreement will not be binding until the exchange of nonconflicting Transaction Confirmations or the passage of the Confirm Deadline without objection from the receiving party, as provided in Section 1.3.

1.3. If a sending party's Transaction Confirmation is materially different from the receiving party's understanding of the agreement referred to in Section 1.2, such receiving party shall notify the sending party via facsimile, EDI or mutually agreeable electronic means by the Confirm Deadline, unless such receiving party has previously sent a Transaction Confirmation to the sending party. The failure of the receiving party to so notify the sending party in writing by the Confirm Deadline constitutes the receiving party's agreement to the terms of the transaction described in the sending party's Transaction Confirmation. If there are any material differences between timely sent Transaction Confirmations governing the same transaction, then neither Transaction Confirmation shall be binding until or unless such differences are resolved including the use of any evidence that clearly resolves the differences in the Transaction Confirmations. In the event of a conflict among the terms of (i) a binding Transaction Confirmation pursuant to Section 1.2, (ii) the oral agreement of the parties which may be evidenced by a recorded conversation, where the parties have selected the Oral Transaction Procedure of the Base Contract, (iii) the Base Contract, and (iv) these General Terms and Conditions, the terms of the documents shall govern in the priority listed in this sentence.

1.4. The parties agree that each party may electronically record all telephone conversations with respect to this Contract between their respective employees, without any special or further notice to the other party. Each party shall obtain any necessary consent of its agents and employees to such recording. Where the parties have selected the Oral Transaction Procedure in Section 1.2 of the Base Contract, the parties agree not to contest the validity or enforceability of telephonic recordings entered into in accordance with the requirements of this Base Contract.

SECTION 2. DEFINITIONS

The terms set forth below shall have the meaning ascribed to them below. Other terms are also defined elsewhere in the Contract and shall have the meanings ascribed to them herein.

2.1. "Additional Event of Default" shall mean Transactional Cross Default or Indebtedness Cross Default, each as and if selected by the parties pursuant to the Base Contract.

2.2. "Affiliate" shall mean, in relation to any person, any entity controlled, directly or indirectly, by the person, any entity that controls, directly or indirectly, the person or any entity directly or indirectly under common control with the person. For this purpose, "control" of any entity or person means ownership of at least 50 percent of the voting power of the entity or person.

2.3. "Alternative Damages" shall mean such damages, expressed in dollars or dollars per MMBtu, as the parties shall agree upon in the Transaction Confirmation, in the event either Seller or Buyer fails to perform a Firm obligation to deliver Gas in the case of Seller or to receive Gas in the case of Buyer.

2.4. "Base Contract" shall mean a contract executed by the parties that incorporates these General Terms and Conditions by reference; that specifies the agreed selections of provisions contained herein; and that sets forth other information required herein and any Special Provisions and addendum(s) as identified on page one.

2.5. "British thermal unit" or "Btu" shall mean the International BTU, which is also called the Btu (IT).

2.6. "Business Day(s)" shall mean Monday through Friday, excluding Federal Banking Holidays for transactions in the U.S.

2.7. "Confirm Deadline" shall mean 5:00 p.m. in the receiving party's time zone on the second Business Day following the Day a Transaction Confirmation is received or, if applicable, on the Business Day agreed to by the parties in the Base Contract; provided, if the Transaction Confirmation is time stamped after 5:00 p.m. in the receiving party's time zone, it shall be deemed received at the opening of the next Business Day.

2.8. "Confirming Party" shall mean the party designated in the Base Contract to prepare and forward Transaction Confirmations to the other party.

2.9. "Contract" shall mean the legally-binding relationship established by (i) the Base Contract, (ii) any and all binding Transaction Confirmations and (iii) where the parties have selected the Oral Transaction Procedure in Section 1.2 of the Base Contract, any and all transactions that the parties have entered into through an EDI transmission or by telephone, but that have not been confirmed in a binding Transaction Confirmation, all of which shall form a single integrated agreement between the parties.

2.10. "Contract Price" shall mean the amount expressed in U.S. Dollars per MMBtu to be paid by Buyer to Seller for the purchase of Gas as agreed to by the parties in a transaction.

2.11. "Contract Quantity" shall mean the quantity of Gas to be delivered and taken as agreed to by the parties in a transaction.

2.12. "Cover Standard", as referred to in Section 3.2, shall mean that if there is an unexcused failure to take or deliver any quantity of Gas pursuant to this Contract, then the performing party shall use commercially reasonable efforts to (i) if Buyer is the performing party, obtain Gas, (or an alternate fuel if elected by Buyer and replacement Gas is not available), or (ii) if Seller is the performing party, sell Gas, in either case, at a price reasonable for the delivery or production area, as applicable, consistent with: the amount of notice provided by the nonperforming party; the immediacy of the Buyer's Gas consumption needs or Seller's Gas sales requirements, as applicable; the quantities involved; and the anticipated length of failure by the nonperforming party.

2.13. "Credit Support Obligation(s)" shall mean any obligation(s) to provide or establish credit support for, or on behalf of, a party to this Contract such as cash, an irrevocable standby letter of credit, a margin agreement, a prepayment, a security interest in an asset, guaranty, or other good and sufficient security of a continuing nature.

2.14. "Day" shall mean a period of 24 consecutive hours, coextensive with a "day" as defined by the Receiving Transporter in a particular transaction.

2.15. "Delivery Period" shall be the period during which deliveries are to be made as agreed to by the parties in a transaction.

2.16. "Delivery Point(s)" shall mean such point(s) as are agreed to by the parties in a transaction.

2.17. "EDI" shall mean an electronic data interchange pursuant to an agreement entered into by the parties, specifically relating to the communication of Transaction Confirmations under this Contract.

2.18. "EFP" shall mean the purchase, sale or exchange of natural Gas as the "physical" side of an exchange for physical transaction involving gas futures contracts. EFP shall incorporate the meaning and remedies of "Firm", provided that a party's excuse for nonperformance of its obligations to deliver or receive Gas will be governed by the rules of the relevant futures exchange regulated under the Commodity Exchange Act.

2.19. "Firm" shall mean that either party may interrupt its performance without liability only to the extent that such performance is prevented for reasons of Force Majeure; provided, however, that during Force Majeure interruptions, the party invoking Force Majeure may be responsible for any Imbalance Charges as set forth in Section 4.3 related to its interruption after the nomination is made to the Transporter and until the change in deliveries and/or receipts is confirmed by the Transporter.

2.20. "Gas" shall mean any mixture of hydrocarbons and noncombustible gases in a gaseous state consisting primarily of methane.

2.21. "Guarantor" shall mean any entity that has provided a guaranty of the obligations of a party hereunder.

2.22. "Imbalance Charges" shall mean any fees, penalties, costs or charges (in cash or in kind) assessed by a Transporter for failure to satisfy the Transporter's balance and/or nomination requirements.

2.23. "Indebtedness Cross Default" shall mean if selected on the Base Contract by the parties with respect to a party, that it or its Guarantor, if any, experiences a default, or similar condition or event however therein defined, under one or more agreements or instruments, individually or collectively, relating to indebtedness (such indebtedness to include any obligation whether present or future, contingent or otherwise, as principal or surety or otherwise) for the payment or repayment of borrowed money in an aggregate amount greater than the threshold specified in the Base Contract with respect to such party or its Guarantor, if any, which results in such indebtedness becoming immediately due and payable.

2.24. "Interruptible" shall mean that either party may interrupt its performance at any time for any reason, whether or not caused by an event of Force Majeure, with no liability, except such interrupting party may be responsible for any Imbalance Charges as set forth in Section 4.3 related to its interruption after the nomination is made to the Transporter and until the change in deliveries and/or receipts is confirmed by Transporter.

2.25. "MMBtu" shall mean one million British thermal units, which is equivalent to one dekatherm.

2.26. "Month" shall mean the period beginning on the first Day of the calendar month and ending immediately prior to the commencement of the first Day of the next calendar month.

2.27. "Payment Date" shall mean a date, as indicated on the Base Contract, on or before which payment is due Seller for Gas received by Buyer in the previous Month.

2.28. "Receiving Transporter" shall mean the Transporter receiving Gas at a Delivery Point, or absent such receiving Transporter, the Transporter delivering Gas at a Delivery Point.

2.29. "Scheduled Gas" shall mean the quantity of Gas confirmed by Transporter(s) for movement, transportation or management.

2.30. "Specified Transaction(s)" shall mean any other transaction or agreement between the parties for the purchase, sale or exchange of physical Gas, and any other transaction or agreement identified as a Specified Transaction under the Base Contract.

2.31. "Spot Price " as referred to in Section 3.2 shall mean the price listed in the publication indicated on the Base Contract, under the listing applicable to the geographic location closest in proximity to the Delivery Point(s) for the relevant Day; provided, if there is no single price published for such location for such Day, but there is published a range of prices, then the Spot Price shall be the average of such high and low prices. If no price or range of prices is published for such Day, then the Spot Price shall be the average of the following: (i) the price (determined as stated above) for the first Day for which a price or range of prices is published that next precedes the relevant Day; and (ii) the price (determined as stated above) for the first Day for which a price or range of prices is published that next follows the relevant Day.

2.32. "Transaction Confirmation" shall mean a document, similar to the form of Exhibit A, setting forth the terms of a transaction formed pursuant to Section 1 for a particular Delivery Period.

2.33. "Transactional Cross Default" shall mean if selected on the Base Contract by the parties with respect to a party, that it shall be in default, however therein defined, under any Specified Transaction.

2.34. "Termination Option" shall mean the option of either party to terminate a transaction in the event that the other party fails to perform a Firm obligation to deliver Gas in the case of Seller or to receive Gas in the case of Buyer for a designated number of days during a period as specified on the applicable Transaction Confirmation.

2.35. "Transporter(s)" shall mean all Gas gathering or pipeline companies, or local distribution companies, acting in the capacity of a transporter, transporting Gas for Seller or Buyer upstream or downstream, respectively, of the Delivery Point pursuant to a particular transaction.

SECTION 3. PERFORMANCE OBLIGATION

3.1. Seller agrees to sell and deliver, and Buyer agrees to receive and purchase, the Contract Quantity for a particular transaction in accordance with the terms of the Contract. Sales and purchases will be on a Firm or Interruptible basis, as agreed to by the parties in a transaction.

The parties have selected either the "Cover Standard" or the "Spot Price Standard" as indicated on the Base Contract.

Cover Standard:

3.2. The sole and exclusive remedy of the parties in the event of a breach of a Firm obligation to deliver or receive Gas shall be recovery of the following: (i) in the event of a breach by Seller on any Day(s), payment by Seller to Buyer in an amount equal to the positive difference, if any, between the purchase price paid by Buyer utilizing the Cover Standard and the Contract Price, adjusted for commercially reasonable differences in transportation costs to or from the Delivery Point(s), multiplied by the difference between the Contract Quantity and the quantity actually delivered by Seller for such Day(s) excluding any quantity for which no replacement is available; or (ii) in the event of a breach by Buyer on any Day(s), payment by Buyer to Seller in the amount equal to the positive difference, if any, between the Contract Price and the price received by Seller utilizing the Cover Standard for the resale of such Gas, adjusted for commercially reasonable differences in transportation costs to or from the Delivery Point(s), multiplied by the difference between the Contract Quantity and the quantity actually taken by Buyer for such Day(s) excluding any quantity for which no sale is available; and (iii) in the event that Buyer has used commercially reasonable efforts to replace the Gas or Seller has used commercially reasonable efforts to sell the Gas to a third party, and no such

replacement or sale is available for all or any portion of the Contract Quantity of Gas, then in addition to (i) or (ii) above, as applicable, the sole and exclusive remedy of the performing party with respect to the Gas not replaced or sold shall be an amount equal to any unfavorable difference between the Contract Price and the Spot Price, adjusted for such transportation to the applicable Delivery Point, multiplied by the quantity of such Gas not replaced or sold. Imbalance Charges shall not be recovered under this Section 3.2, but Seller and/or Buyer shall be responsible for Imbalance Charges, if any, as provided in Section 4.3. The amount of such unfavorable difference shall be payable five Business Days after presentation of the performing party's invoice, which shall set forth the basis upon which such amount was calculated.

Spot Price Standard:

3.2. The sole and exclusive remedy of the parties in the event of a breach of a Firm obligation to deliver or receive Gas shall be recovery of the following: (i) in the event of a breach by Seller on any Day(s), payment by Seller to Buyer in an amount equal to the difference between the Contract Quantity and the actual quantity delivered by Seller and received by Buyer for such Day(s), multiplied by the positive difference, if any, obtained by subtracting the Contract Price from the Spot Price; or (ii) in the event of a breach by Buyer on any Day(s), payment by Buyer to Seller in an amount equal to the difference between the Contract Quantity and the actual quantity delivered by Seller and received by Buyer for such Day(s), multiplied by the positive difference, if any, obtained by subtracting the applicable Spot Price from the Contract Price. Imbalance Charges shall not be recovered under this Section 3.2, but Seller and/or Buyer shall be responsible for Imbalance Charges, if any, as provided in Section 4.3. The amount of such unfavorable difference shall be payable five Business Days after presentation of the performing party's invoice, which shall set forth the basis upon which such amount was calculated.

3.3. Notwithstanding Section 3.2, the parties may agree to Alternative Damages in a Transaction Confirmation executed in writing by both parties.

3.4. In addition to Sections 3.2 and 3.3, the parties may provide for a Termination Option in a Transaction Confirmation executed in writing by both parties. The Transaction Confirmation containing the Termination Option will designate the length of nonperformance triggering the Termination Option and the procedures for exercise thereof, how damages for nonperformance will be compensated, and how liquidation costs will be calculated.

SECTION 4. TRANSPORTATION, NOMINATIONS, AND IMBALANCES

4.1. Seller shall have the sole responsibility for transporting the Gas to the Delivery Point(s). Buyer shall have the sole responsibility for transporting the Gas from the Delivery Point(s).

4.2. The parties shall coordinate their nomination activities, giving sufficient time to meet the deadlines of the affected Transporter(s). Each party shall give the other party timely prior Notice, sufficient to meet the requirements of all Transporter(s) involved in the transaction, of the quantities of Gas to be delivered and purchased each Day. Should either party become aware that actual deliveries at the Delivery Point(s) are greater or lesser than the Scheduled Gas, such party shall promptly notify the other party.

4.3. The parties shall use commercially reasonable efforts to avoid imposition of any Imbalance Charges. If Buyer or Seller receives an invoice from a Transporter that includes Imbalance Charges, the parties shall determine the validity as well as the cause of such Imbalance Charges. If the Imbalance Charges were incurred as a result of Buyer's receipt of quantities of Gas greater than or less than the Scheduled Gas, then Buyer shall pay for such Imbalance Charges or reimburse Seller for such Imbalance Charges paid by Seller. If the Imbalance Charges were incurred as a result of Seller's delivery of quantities of Gas greater than or less than the Scheduled Gas, then Seller shall pay for such Imbalance Charges or reimburse Buyer for such Imbalance Charges paid by Buyer.

SECTION 5. QUALITY AND MEASUREMENT

All Gas delivered by Seller shall meet the pressure, quality and heat content requirements of the Receiving Transporter. The unit of quantity measurement for purposes of this Contract shall be one MMBtu dry. Measurement of Gas quantities hereunder shall be in accordance with the established procedures of the Receiving Transporter.

SECTION 6. TAXES

The parties have selected either "Buyer Pays At and After Delivery Point" or "Seller Pays Before and At Delivery Point" as indicated on the Base Contract.

Buyer Pays At and After Delivery Point:

Seller shall pay or cause to be paid all taxes, fees, levies, penalties, licenses or charges imposed by any government authority ("Taxes") on or with respect to the Gas prior to the Delivery Point(s). Buyer shall pay or cause to be paid all Taxes on or with respect to the Gas at the Delivery Point(s) and all Taxes after the Delivery Point(s). If a party is required to remit or pay Taxes that are the other party's responsibility hereunder, the party responsible for such Taxes shall promptly reimburse the other party for such Taxes. Any party entitled to an exemption from any such Taxes or charges shall furnish the other party any necessary documentation thereof.

Seller Pays Before and At Delivery Point:

Seller shall pay or cause to be paid all taxes, fees, levies, penalties, licenses or charges imposed by any government authority ("Taxes") on or with respect to the Gas prior to the Delivery Point(s) and all Taxes at the Delivery Point(s). Buyer shall pay or cause to be paid all Taxes on or with respect to the Gas after the Delivery Point(s). If a party is required to remit or pay Taxes that are the other party's

responsibility hereunder, the party responsible for such Taxes shall promptly reimburse the other party for such Taxes. Any party entitled to an exemption from any such Taxes or charges shall furnish the other party any necessary documentation thereof.

SECTION 7. BILLING, PAYMENT, AND AUDIT

7.1. Seller shall invoice Buyer for Gas delivered and received in the preceding Month and for any other applicable charges, providing supporting documentation acceptable in industry practice to support the amount charged. If the actual quantity delivered is not known by the billing date, billing will be prepared based on the quantity of Scheduled Gas. The invoiced quantity will then be adjusted to the actual quantity on the following Month's billing or as soon thereafter as actual delivery information is available.

7.2. Buyer shall remit the amount due under Section 7.1 in the manner specified in the Base Contract, in immediately available funds, on or before the later of the Payment Date or 10 Days after receipt of the invoice by Buyer; provided that if the Payment Date is not a Business Day, payment is due on the next Business Day following that date. In the event any payments are due Buyer hereunder, payment to Buyer shall be made in accordance with this Section 7.2.

7.3. In the event payments become due pursuant to Sections 3.2 or 3.3, the performing party may submit an invoice to the nonperforming party for an accelerated payment setting forth the basis upon which the invoiced amount was calculated. Payment from the nonperforming party will be due five Business Days after receipt of invoice.

7.4. If the invoiced party, in good faith, disputes the amount of any such invoice or any part thereof, such invoiced party will pay such amount as it concedes to be correct; provided, however, if the invoiced party disputes the amount due, it must provide supporting documentation acceptable in industry practice to support the amount paid or disputed without undue delay. In the event the parties are unable to resolve such dispute, either party may pursue any remedy available at law or in equity to enforce its rights pursuant to this Section.

7.5. If the invoiced party fails to remit the full amount payable when due, interest on the unpaid portion shall accrue from the date due until the date of payment at a rate equal to the lower of (i) the then-effective prime rate of interest published under "Money Rates" by The Wall Street Journal, plus two percent per annum; or (ii) the maximum applicable lawful interest rate.

7.6. A party shall have the right, at its own expense, upon reasonable Notice and at reasonable times, to examine and audit and to obtain copies of the relevant portion of the books, records, and telephone recordings of the other party only to the extent reasonably necessary to verify the accuracy of any statement, charge, payment, or computation made under the Contract. This right to examine, audit, and to obtain copies shall not be available with respect to proprietary information not directly relevant to transactions under this Contract. All invoices and billings shall be conclusively presumed final and accurate and all associated claims for under- or overpayments shall be deemed waived unless such invoices or billings are objected to in writing, with adequate explanation and/or documentation, within two years after the Month of Gas delivery. All retroactive adjustments under Section 7 shall be paid in full by the party owing payment within 30 Days of Notice and substantiation of such inaccuracy.

7.7. Unless the parties have elected on the Base Contract not to make this Section 7.7 applicable to this Contract, the parties shall net all undisputed amounts due and owing, and/or past due, arising under the Contract such that the party owing the greater amount shall make a single payment of the net amount to the other party in accordance with Section 7; provided that no payment required to be made pursuant to the terms of any Credit Support Obligation or pursuant to Section 7.3 shall be subject to netting under this Section. If the parties have executed a separate netting agreement, the terms and conditions therein shall prevail to the extent inconsistent herewith.

SECTION 8. TITLE, WARRANTY, AND INDEMNITY

8.1. Unless otherwise specifically agreed, title to the Gas shall pass from Seller to Buyer at the Delivery Point(s). Seller shall have responsibility for and assume any liability with respect to the Gas prior to its delivery to Buyer at the specified Delivery Point(s). Buyer shall have responsibility for and assume any liability with respect to said Gas after its delivery to Buyer at the Delivery Point(s).

8.2. Seller warrants that it will have the right to convey and will transfer good and merchantable title to all Gas sold hereunder and delivered by it to Buyer, free and clear of all liens, encumbrances, and claims. EXCEPT AS PROVIDED IN THIS SECTION 8.2 AND IN SECTION 15.8, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE, ARE DISCLAIMED.

8.3. Seller agrees to indemnify Buyer and save it harmless from all losses, liabilities or claims including reasonable attorneys' fees and costs of court ("Claims"), from any and all persons, arising from or out of claims of title, personal injury (including death) or property damage from said Gas or other charges thereon which attach before title passes to Buyer. Buyer agrees to indemnify Seller and save it harmless from all Claims, from any and all persons, arising from or out of claims regarding payment, personal injury (including death) or property damage from said Gas or other charges thereon which attach after title passes to Buyer.

8.4. The parties agree that the delivery of and the transfer of title to all Gas under this Contract shall take place within the Customs Territory of the United States (as defined in general note 2 of the Harmonized Tariff Schedule of the United States 19 U.S.C. §1202, General Notes, page 3); provided, however, that in the event Seller took title to the Gas outside the Customs Territory of the United States, Seller represents and warrants that it is the importer of record for all Gas entered and delivered into the United States, and shall be responsible for entry and entry summary filings as well as the payment of duties, taxes and fees, if any, and all applicable record keeping requirements.

8.5. Notwithstanding the other provisions of this Section 8, as between Seller and Buyer, Seller will be liable for all Claims to the extent that such arise from the failure of Gas delivered by Seller to meet the quality requirements of Section 5.

SECTION 9. NOTICES

9.1. All Transaction Confirmations, invoices, payment instructions, and other communications made pursuant to the Base Contract ("Notices") shall be made to the addresses specified in writing by the respective parties from time to time.

9.2. All Notices required hereunder shall be in writing and may be sent by facsimile or mutually acceptable electronic means, a nationally recognized overnight courier service, first class mail or hand delivered.

9.3. Notice shall be given when received on a Business Day by the addressee. In the absence of proof of the actual receipt date, the following presumptions will apply. Notices sent by facsimile shall be deemed to have been received upon the sending party's receipt of its facsimile machine's confirmation of successful transmission. If the day on which such facsimile is received is not a Business Day or is after five p.m. on a Business Day, then such facsimile shall be deemed to have been received on the next following Business Day. Notice by overnight mail or courier shall be deemed to have been received on the next Business Day after it was sent or such earlier time as is confirmed by the receiving party. Notice via first class mail shall be considered delivered five Business Days after mailing.

9.4. The party receiving a commercially acceptable Notice of change in payment instructions or other payment information shall not be obligated to implement such change until ten Business Days after receipt of such Notice.

SECTION 10. FINANCIAL RESPONSIBILITY

10.1. If either party ("X") has reasonable grounds for insecurity regarding the performance of any obligation under this Contract (whether or not then due) by the other party ("Y") (including, without limitation, the occurrence of a material change in the creditworthiness of Y or its Guarantor, if applicable), X may demand Adequate Assurance of Performance. "Adequate Assurance of Performance" shall mean sufficient security in the form, amount, for a term, and from an issuer, all as reasonably acceptable to X, including, but not limited to cash, a standby irrevocable letter of credit, a prepayment, a security interest in an asset or guaranty. Y hereby grants to X a continuing first priority security interest in, lien on, and right of setoff against all Adequate Assurance of Performance in the form of cash transferred by Y to X pursuant to this Section 10.1. Upon the return by X to Y of such Adequate Assurance of Performance, the security interest and lien granted hereunder on that Adequate Assurance of Performance shall be released automatically and, to the extent possible, without any further action by either party.

10.2. In the event (each an "Event of Default") either party (the "Defaulting Party") or its Guarantor shall: (i) make an assignment or any general arrangement for the benefit of creditors; (ii) file a petition or otherwise commence, authorize, or acquiesce in the commencement of a proceeding or case under any bankruptcy or similar law for the protection of creditors or have such petition filed or proceeding commenced against it; (iii) otherwise become bankrupt or insolvent (however evidenced); (iv) be unable to pay its debts as they fall due; (v) have a receiver, provisional liquidator, conservator, custodian, trustee or other similar official appointed with respect to it or substantially all of its assets; (vi) fail to perform any obligation to the other party with respect to any Credit Support Obligations relating to the Contract; (vii) fail to give Adequate Assurance of Performance under Section 10.1 within 48 hours but at least one Business Day of a written request by the other party; (viii) not have paid any amount due the other party hereunder on or before the second Business Day following written Notice that such payment is due; or ix) be the affected party with respect to any Additional Event of Default; then the other party (the "Non-Defaulting Party") shall have the right, at its sole election, to immediately withhold and/or suspend deliveries or payments upon Notice and/or to terminate and liquidate the transactions under the Contract, in the manner provided in Section 10.3, in addition to any and all other remedies available hereunder.

10.3. If an Event of Default has occurred and is continuing, the Non-Defaulting Party shall have the right, by Notice to the Defaulting Party, to designate a Day, no earlier than the Day such Notice is given and no later than 20 Days after such Notice is given, as an early termination date (the "Early Termination Date") for the liquidation and termination pursuant to Section 10.3.1 of all transactions under the Contract, each a "Terminated Transaction". On the Early Termination Date, all transactions will terminate, other than those transactions, if any, that may not be liquidated and terminated under applicable law ("Excluded Transactions"), which Excluded Transactions must be liquidated and terminated as soon thereafter as is legally permissible, and upon termination shall be a Terminated Transaction and be valued consistent with Section 10.3.1 below. With respect to each Excluded Transaction, its actual termination date shall be the Early Termination Date for purposes of Section 10.3.1.

The parties have selected either "Early Termination Damages Apply" or "Early Termination Damages Do Not Apply" as indicated on the Base Contract.
Early Termination Damages Apply:
10.3.1. As of the Early Termination Date, the Non-Defaulting Party shall determine, in good faith and in a commercially reasonable manner, (i) the amount owed (whether or not then due) by each party with respect to all Gas delivered and received between the parties under Terminated Transactions and Excluded Transactions on and before the Early Termination Date and all other applicable charges relating to such deliveries and receipts (including without limitation any amounts owed under Section 3.2), for which payment has not yet been made by the party that owes such payment under this Contract and (ii) the Market Value, as defined below, of each Terminated Transaction. The Non-Defaulting Party shall (x) liquidate and accelerate each Terminated

Transaction at its Market Value, so that each amount equal to the difference between such Market Value and the Contract Value, as defined below, of such Terminated Transaction(s) shall be due to the Buyer under the Terminated Transaction(s) if such Market Value exceeds the Contract Value and to the Seller if the opposite is the case; and (y) where appropriate, discount each amount then due under clause (x) above to present value in a commercially reasonable manner as of the Early Termination Date (to take account of the period between the date of liquidation and the date on which such amount would have otherwise been due pursuant to the relevant Terminated Transactions).

For purposes of this Section 10.3.1, "Contract Value" means the amount of Gas remaining to be delivered or purchased under a transaction multiplied by the Contract Price, and "Market Value" means the amount of Gas remaining to be delivered or purchased under a transaction multiplied by the market price for a similar transaction at the Delivery Point determined by the Non-Defaulting Party in a commercially reasonable manner. To ascertain the Market Value, the Non-Defaulting Party may consider, among other valuations, any or all of the settlement prices of NYMEX Gas futures contracts, quotations from leading dealers in energy swap contracts or physical gas trading markets, similar sales or purchases and any other bona fide third-party offers, all adjusted for the length of the term and differences in transportation costs. A party shall not be required to enter into a replacement transaction(s) in order to determine the Market Value. Any extension(s) of the term of a transaction to which parties are not bound as of the Early Termination Date (including but not limited to "evergreen provisions") shall not be considered in determining Contract Values and Market Values. For the avoidance of doubt, any option pursuant to which one party has the right to extend the term of a transaction shall be considered in determining Contract Values and Market Values. The rate of interest used in calculating net present value shall be determined by the Non-Defaulting Party in a commercially reasonable manner.

Early Termination Damages Do Not Apply:

10.3.1. As of the Early Termination Date, the Non-Defaulting Party shall determine, in good faith and in a commercially reasonable manner, the amount owed (whether or not then due) by each party with respect to all Gas delivered and received between the parties under Terminated Transactions and Excluded Transactions on and before the Early Termination Date and all other applicable charges relating to such deliveries and receipts (including without limitation any amounts owed under Section 3.2), for which payment has not yet been made by the party that owes such payment under this Contract.

The parties have selected either "Other Agreement Setoffs Apply" or "Other Agreement Setoffs Do Not Apply" as indicated on the Base Contract.

Other Agreement Setoffs Apply:

Bilateral Setoff Option:

10.3.2. The Non-Defaulting Party shall net or aggregate, as appropriate, any and all amounts owing between the parties under Section 10.3.1, so that all such amounts are netted or aggregated to a single liquidated amount payable by one party to the other (the "Net Settlement Amount"). At its sole option and without prior Notice to the Defaulting Party, the Non-Defaulting Party is hereby authorized to setoff any Net Settlement Amount against (i) any margin or other collateral held by a party in connection with any Credit Support Obligation relating to the Contract; and (ii) any amount(s) (including any excess cash margin or excess cash collateral) owed or held by the party that is entitled to the Net Settlement Amount under any other agreement or arrangement between the parties.

Triangular Setoff Option:

10.3.2. The Non-Defaulting Party shall net or aggregate, as appropriate, any and all amounts owing between the parties under Section 10.3.1, so that all such amounts are netted or aggregated to a single liquidated amount payable by one party to the other (the "Net Settlement Amount"). At its sole option, and without prior Notice to the Defaulting Party, the Non-Defaulting Party is hereby authorized to setoff (i) any Net Settlement Amount against any margin or other collateral held by a party in connection with any Credit Support Obligation relating to the Contract; (ii) any Net Settlement Amount against any amount(s) (including any excess cash margin or excess cash collateral) owed by or to a party under any other agreement or arrangement between the parties; (iii) any Net Settlement Amount owed to the Non-Defaulting Party against any amount(s) (including any excess cash margin or excess cash collateral) owed by the Non-Defaulting Party or its Affiliates to the Defaulting Party under any other agreement or arrangement; (iv) any Net Settlement Amount owed to the Defaulting Party against any amount(s) (including any excess cash margin or excess cash collateral) owed by the Defaulting Party to the Non-Defaulting Party or its Affiliates under any other agreement or arrangement; and/or (v) any Net Settlement Amount owed to the Defaulting Party against any amount(s) (including any excess cash margin or excess cash collateral) owed by the Defaulting Party or its Affiliates to the Non-Defaulting Party under any other agreement or arrangement.

Other Agreement Setoffs Do Not Apply:

10.3.2. The Non-Defaulting Party shall net or aggregate, as appropriate, any and all amounts owing between the parties under Section 10.3.1, so that all such amounts are netted or aggregated to a single liquidated amount payable by one party to the other (the "Net Settlement Amount"). At its sole option and without prior Notice to the Defaulting Party, the Non-Defaulting Party may setoff any Net Settlement Amount against any margin or other collateral held by a party in connection with any Credit Support Obligation relating to the Contract.

10.3.3. If any obligation that is to be included in any netting, aggregation or setoff pursuant to Section 10.3.2 is unascertained, the Non-Defaulting Party may in good faith estimate that obligation and net, aggregate or setoff, as applicable, in respect of the estimate, subject to the Non-Defaulting Party accounting to the Defaulting Party when the obligation is ascertained.

Any amount not then due which is included in any netting, aggregation or setoff pursuant to Section 10.3.2 shall be discounted to net present value in a commercially reasonable manner determined by the Non-Defaulting Party.

10.4. As soon as practicable after a liquidation, Notice shall be given by the Non-Defaulting Party to the Defaulting Party of the Net Settlement Amount, and whether the Net Settlement Amount is due to or due from the Non-Defaulting Party. The Notice shall include a written statement explaining in reasonable detail the calculation of the Net Settlement Amount, provided that failure to give such Notice shall not affect the validity or enforceability of the liquidation or give rise to any claim by the Defaulting Party against the Non-Defaulting Party. The Net Settlement Amount as well as any setoffs applied against such amount pursuant to Section 10.3.2, shall be paid by the close of business on the second Business Day following such Notice, which date shall not be earlier than the Early Termination Date. Interest on any unpaid portion of the Net Settlement Amount as adjusted by setoffs, shall accrue from the date due until the date of payment at a rate equal to the lower of (i) the then-effective prime rate of interest published under "Money Rates" by The Wall Street Journal, plus two percent per annum; or (ii) the maximum applicable lawful interest rate.

10.5. The parties agree that the transactions hereunder constitute a "forward contract" within the meaning of the United States Bankruptcy Code and that Buyer and Seller are each "forward contract merchants" within the meaning of the United States Bankruptcy Code.

10.6. The Non-Defaulting Party's remedies under this Section 10 are the sole and exclusive remedies of the Non-Defaulting Party with respect to the occurrence of any Early Termination Date. Each party reserves to itself all other rights, setoffs, counterclaims and other defenses that it is or may be entitled to arising from the Contract.

10.7. With respect to this Section 10, if the parties have executed a separate netting agreement with close-out netting provisions, the terms and conditions therein shall prevail to the extent inconsistent herewith.

SECTION 11. FORCE MAJEURE

11.1. Except with regard to a party's obligation to make payment(s) due under Section 7, Section 10.4, and Imbalance Charges under Section 4, neither party shall be liable to the other for failure to perform a Firm obligation, to the extent such failure was caused by Force Majeure. The term "Force Majeure" as employed herein means any cause not reasonably within the control of the party claiming suspension, as further defined in Section 11.2.

11.2. Force Majeure shall include, but not be limited to, the following: (i) physical events such as acts of God, landslides, lightning, earthquakes, fires, storms or storm warnings, such as hurricanes, which result in evacuation of the affected area, floods, washouts, explosions, breakage or accident or necessity of repairs to machinery or equipment or lines of pipe; (ii) weather related events affecting an entire geographic region, such as low temperatures which cause freezing or failure of wells or lines of pipe; (iii) interruption and/or curtailment of Firm transportation and/or storage by Transporters; (iv) acts of others such as strikes, lockouts or other industrial disturbances, riots, sabotage, insurrections or wars, or acts of terror; and (v) governmental actions such as necessity for compliance with any court order, law, statute, ordinance, regulation, or policy having the effect of law promulgated by a governmental authority having jurisdiction. Seller and Buyer shall make reasonable efforts to avoid the adverse impacts of a Force Majeure and to resolve the event or occurrence once it has occurred in order to resume performance.

11.3. Neither party shall be entitled to the benefit of the provisions of Force Majeure to the extent performance is affected by any or all of the following circumstances: (i) the curtailment of interruptible or secondary Firm transportation unless primary, in-path, Firm transportation is also curtailed; (ii) the party claiming excuse failed to remedy the condition and to resume the performance of such covenants or obligations with reasonable dispatch; or (iii) economic hardship, to include, without limitation, Seller's ability to sell Gas at a higher or more advantageous price than the Contract Price, Buyer's ability to purchase Gas at a lower or more advantageous price than the Contract Price, or a regulatory agency disallowing, in whole or in part, the pass through of costs resulting from this Contract; (iv) the loss of Buyer's market(s) or Buyer's inability to use or resell Gas purchased hereunder, except, in either case, as provided in Section 11.2; or (v) the loss or failure of Seller's gas supply or depletion of reserves, except, in either case, as provided in Section 11.2. The party claiming Force Majeure shall not be excused from its responsibility for Imbalance Charges.

11.4. Notwithstanding anything to the contrary herein, the parties agree that the settlement of strikes, lockouts or other industrial disturbances shall be within the sole discretion of the party experiencing such disturbance.

11.5. The party whose performance is prevented by Force Majeure must provide Notice to the other party. Initial Notice may be given orally; however, written Notice with reasonably full particulars of the event or occurrence is required as soon as reasonably possible. Upon providing written Notice of Force Majeure to the other party, the affected party will be relieved of its obligation, from the onset of the Force Majeure event, to make or accept delivery of Gas, as applicable, to the extent and for the duration of Force Majeure, and neither party shall be deemed to have failed in such obligations to the other during such occurrence or event.

11.6. Notwithstanding Sections 11.2 and 11.3, the parties may agree to alternative Force Majeure provisions in a Transaction Confirmation executed in writing by both parties.

SECTION 12. TERM

This Contract may be terminated on 30 Day's written Notice, but shall remain in effect until the expiration of the latest Delivery Period of any transaction(s). The rights of either party pursuant to Section 7.6, Section 10, Section 13, the obligations to make payment hereunder, and the obligation of either party to indemnify the other, pursuant hereto shall survive the termination of the Base Contract or any transaction.

SECTION 13. LIMITATIONS

FOR BREACH OF ANY PROVISION FOR WHICH AN EXPRESS REMEDY OR MEASURE OF DAMAGES IS PROVIDED, SUCH EXPRESS REMEDY OR MEASURE OF DAMAGES SHALL BE THE SOLE AND EXCLUSIVE REMEDY. A PARTY'S LIABILITY HEREUNDER SHALL BE LIMITED AS SET FORTH IN SUCH PROVISION, AND ALL OTHER REMEDIES OR DAMAGES AT LAW OR IN EQUITY ARE WAIVED. IF NO REMEDY OR MEASURE OF DAMAGES IS EXPRESSLY PROVIDED HEREIN OR IN A TRANSACTION, A PARTY'S LIABILITY SHALL BE LIMITED TO DIRECT ACTUAL DAMAGES ONLY. SUCH DIRECT ACTUAL DAMAGES SHALL BE THE SOLE AND EXCLUSIVE REMEDY, AND ALL OTHER REMEDIES OR DAMAGES AT LAW OR IN EQUITY ARE WAIVED. UNLESS EXPRESSLY HEREIN PROVIDED, NEITHER PARTY SHALL BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, PUNITIVE, EXEMPLARY OR INDIRECT DAMAGES, LOST PROFITS OR OTHER BUSINESS INTERRUPTION DAMAGES, BY STATUTE, IN TORT OR CONTRACT, UNDER ANY INDEMNITY PROVISION OR OTHERWISE. IT IS THE INTENT OF THE PARTIES THAT THE LIMITATIONS HEREIN IMPOSED ON REMEDIES AND THE MEASURE OF DAMAGES BE WITHOUT REGARD TO THE CAUSE OR CAUSES RELATED THERETO, INCLUDING THE NEGLIGENCE OF ANY PARTY, WHETHER SUCH NEGLIGENCE BE SOLE, JOINT OR CONCURRENT, OR ACTIVE OR PASSIVE. TO THE EXTENT ANY DAMAGES REQUIRED TO BE PAID HEREUNDER ARE LIQUIDATED, THE PARTIES ACKNOWLEDGE THAT THE DAMAGES ARE DIFFICULT OR IMPOSSIBLE TO DETERMINE, OR OTHERWISE OBTAINING AN ADEQUATE REMEDY IS INCONVENIENT AND THE DAMAGES CALCULATED HEREUNDER CONSTITUTE A REASONABLE APPROXIMATION OF THE HARM OR LOSS.

SECTION 14. MARKET DISRUPTION

If a Market Disruption Event has occurred then the parties shall negotiate in good faith to agree on a replacement price for the Floating Price (or on a method for determining a replacement price for the Floating Price) for the affected Day, and if the parties have not so agreed on or before the second Business Day following the affected Day then the replacement price for the Floating Price shall be determined within the next two following Business Days with each party obtaining, in good faith and from non- affiliated market participants in the relevant market, two quotes for prices of Gas for the affected Day of a similar quality and quantity in the geographical location closest in proximity to the Delivery Point and averaging the four quotes. If either party fails to provide two quotes then the average of the other party's two quotes shall determine the replacement price for the Floating Price. "Floating Price" means the price or a factor of the price agreed to in the transaction as being based upon a specified index. "Market Disruption Event" means, with respect to an index specified for a transaction, any of the following events: (a) the failure of the index to announce or publish information necessary for determining the Floating Price; (b) the failure of trading to commence or the permanent discontinuation or material suspension of trading on the exchange or market acting as the index; (c) the temporary or permanent discontinuance or unavailability of the index; (d) the temporary or permanent closing of any exchange acting as the index; or (e) both parties agree that a material change in the formula for or the method of determining the Floating Price has occurred. For the purposes of the calculation of a replacement price for the Floating Price, all numbers shall be rounded to three decimal places. If the fourth decimal number is five or greater, then the third decimal number shall be increased by one and if the fourth decimal number is less than five, then the third decimal number shall remain unchanged.

SECTION 15. MISCELLANEOUS

15.1. This Contract shall be binding upon and inure to the benefit of the successors, assigns, personal representatives, and heirs of the respective parties hereto, and the covenants, conditions, rights and obligations of this Contract shall run for the full term of this Contract. No assignment of this Contract, in whole or in part, will be made without the prior written consent of the non-assigning party (and shall not relieve the assigning party from liability hereunder), which consent will not be unreasonably withheld or delayed; provided, either party may (i) transfer, sell, pledge, encumber, or assign this Contract or the accounts, revenues, or proceeds hereof in connection with any financing or other financial arrangements, or (ii) transfer its interest to any parent or Affiliate by assignment, merger or otherwise without the prior approval of the other party. Upon any such assignment, transfer and assumption, the transferor shall remain principally liable for and shall not be relieved of or discharged from any obligations hereunder.

15.2. If any provision in this Contract is determined to be invalid, void or unenforceable by any court having jurisdiction, such determination shall not invalidate, void, or make unenforceable any other provision, agreement or covenant of this Contract.

15.3. No waiver of any breach of this Contract shall be held to be a waiver of any other or subsequent breach.

15.4. This Contract sets forth all understandings between the parties respecting each transaction subject hereto, and any prior contracts, understandings and representations, whether oral or written, relating to such transactions are merged into and superseded by this Contract and any effective transaction(s). This Contract may be amended only by a writing executed by both parties.

15.5. The interpretation and performance of this Contract shall be governed by the laws of the jurisdiction as indicated on the Base Contract, excluding, however, any conflict of laws rule which would apply the law of another jurisdiction.

15.6. This Contract and all provisions herein will be subject to all applicable and valid statutes, rules, orders and regulations of any governmental authority having jurisdiction over the parties, their facilities, or Gas supply, this Contract or transaction or any provisions thereof.

15.7. There is no third party beneficiary to this Contract.

15.8. Each party to this Contract represents and warrants that it has full and complete authority to enter into and perform this Contract. Each person who executes this Contract on behalf of either party represents and warrants that it has full and complete authority to do so and that such party will be bound thereby.

15.9. The headings and subheadings contained in this Contract are used solely for convenience and do not constitute a part of this Contract between the parties and shall not be used to construe or interpret the provisions of this Contract.

15.10. Unless the parties have elected on the Base Contract not to make this Section 15.10 applicable to this Contract, neither party shall disclose directly or indirectly without the prior written consent of the other party the terms of any transaction to a third party (other than the employees, lenders, royalty owners, counsel, accountants and other agents of the party, or prospective purchasers of all or substantially all of a party's assets or of any rights under this Contract, provided such persons shall have agreed to keep such terms confidential) except (i) in order to comply with any applicable law, order, regulation, or exchange rule, (ii) to the extent necessary for the enforcement of this Contract , (iii) to the extent necessary to implement any transaction, (iv) to the extent necessary to comply with a regulatory agency's reporting requirements including but not limited to gas cost recovery proceedings; or (v) to the extent such information is delivered to such third party for the sole purpose of calculating a published index. Each party shall notify the other party of any proceeding of which it is aware which may result in disclosure of the terms of any transaction (other than as permitted hereunder) and use reasonable efforts to prevent or limit the disclosure. The existence of this Contract is not subject to this confidentiality obligation. Subject to Section 13, the parties shall be entitled to all remedies available at law or in equity to enforce, or seek relief in connection with this confidentiality obligation. The terms of any transaction hereunder shall be kept confidential by the parties hereto for one year from the expiration of the transaction.

In the event that disclosure is required by a governmental body or applicable law, the party subject to such requirement may disclose the material terms of this Contract to the extent so required, but shall promptly notify the other party, prior to disclosure, and shall cooperate (consistent with the disclosing party's legal obligations) with the other party's efforts to obtain protective orders or similar restraints with respect to such disclosure at the expense of the other party.

15.11. The parties may agree to dispute resolution procedures in Special Provisions attached to the Base Contract or in a Transaction Confirmation executed in writing by both parties

15.12. Any original executed Base Contract, Transaction Confirmation or other related document may be digitally copied, photocopied, or stored on computer tapes and disks (the "Imaged Agreement"). The Imaged Agreement, if introduced as evidence on paper, the Transaction Confirmation, if introduced as evidence in automated facsimile form, the recording, if introduced as evidence in its original form, and all computer records of the foregoing, if introduced as evidence in printed format, in any judicial, arbitration, mediation or administrative proceedings will be admissible as between the parties to the same extent and under the same conditions as other business records originated and maintained in documentary form. Neither Party shall object to the admissibility of the recording, the Transaction Confirmation, or the Imaged Agreement on the basis that such were not originated or maintained in documentary form. However, nothing herein shall be construed as a waiver of any other objection to the admissibility of such evidence.

DISCLAIMER: The purposes of this Contract are to facilitate trade, avoid misunderstandings and make more definite the terms of contracts of purchase and sale of natural gas. Further, NAESB does not mandate the use of this Contract by any party. **NAESB DISCLAIMS AND EXCLUDES, AND ANY USER OF THIS CONTRACT ACKNOWLEDGES AND AGREES TO NAESB'S DISCLAIMER OF, ANY AND ALL WARRANTIES, CONDITIONS OR REPRESENTATIONS, EXPRESS OR IMPLIED, ORAL OR WRITTEN, WITH RESPECT TO THIS CONTRACT OR ANY PART THEREOF, INCLUDING ANY AND ALL IMPLIED WARRANTIES OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE (WHETHER OR NOT NAESB KNOWS, HAS REASON TO KNOW, HAS BEEN ADVISED, OR IS OTHERWISE IN FACT AWARE OF ANY SUCH PURPOSE), WHETHER ALLEGED TO ARISE BY LAW, BY REASON OF CUSTOM OR USAGE IN THE TRADE, OR BY COURSE OF DEALING. EACH USER OF THIS CONTRACT ALSO AGREES THAT UNDER NO CIRCUMSTANCES WILL NAESB BE LIABLE FOR ANY DIRECT, SPECIAL, INCIDENTAL, EXEMPLARY, PUNITIVE OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY USE OF THIS CONTRACT.**

TRANSACTION CONFIRMATION FOR IMMEDIATE DELIVERY

Date: Feb 21, 2018

Transaction Confirmation #: _____

This Transaction Confirmation is subject to the Base Contract between Seller and Buyer dated February 21, 2018. The terms of this Transaction Confirmation are binding upon execution by the parties.

SELLER:
Lakeside Pipeline LLC
Attn: Daryl Maas
Phone:
Fax:
Base Contract No. _____
Transporter: _____
Transporter Contract Number: _____

BUYER:
Clean Energy Renewable Fuels, LLC
Attn: Tyler Henn
Phone:
Fax:
Base Contract No. _____
Transporter: _____
Transporter Contract Number: _____

Contract Price: See Contract Price below under "Special Conditions" below.

Delivery Period: Begin: (Date on which the Conditions Precedent below are satisfied)
End: The initial term shall end five (5) years after the beginning of the Delivery Period. Thereafter, the Delivery Period shall automatically renew, under the same terms and conditions, for consecutive 1 year terms unless either party provides the other with written notice of termination at least 90 days prior to the applicable renewal date.

Performance Obligation and Contract Quantity: (Select One)

Firm (Fixed Quantity):
_____ MMBtus/day

☐ EFP

Firm (Variable Quantity):
0 MMBtus/day Minimum ("**MinDailyQty**")
1,800 MMBtus/day Maximum ("**MaxDailyQty**")

Interruptible:
Up to _____ MMBtus/day.

Seller may provide up to the MaxDailyQty of Biogas each day. In the event there is sufficient Biogas supply from the Project, Seller may provide Buyer with up to 125% of the MaxDailyQty of Biogas upon 90 days prior written notice. Seller shall have a firm obligation to deliver and Buyer shall have a firm obligation to purchase up to the MaxDailyQty.

This Transaction Confirmation is unit contingent on sufficient Biogas availability at the Project(s). For the avoidance of doubt and notwithstanding anything to the contrary in this Transaction Confirmation or the Base Contract, in the event there is not sufficient Biogas availability at the Project(s) to supply Biogas to Buyer, nothing in this Transaction Confirmation shall require Seller to supply Biogas to Buyer while such Biogas is not available from the Project(s).

Delivery Points: Seller's injection point on the SoCal Gas natural gas transportation system.

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Buyer and Seller agree that Seller is solely responsible for all utility interconnect and/or related pipeline charges for the transportation of the RNG from the Project to the Delivery Point(s).

Gas Nominations: Seller will provide a schedule of monthly gas nominations at least five (5) business days prior to the commencement of the month. Seller agrees to make any changes to the monthly schedule of nominations of RNG volumes by 9:00 a.m. PPT at least two (2) business days prior for delivery on any weekday. All nominations for Saturday, Sunday and Monday shall be binding unless Seller provides notice of any revisions to such nominations by 5pm PST on the Thursday prior.

Special Conditions:

1.0 Definitions

Advanced Biofuel: means a renewable fuel as set forth in the EPA RFS program (40 C.F.R. § 80.1401 (2012)), other than ethanol derived from corn starch, and which must achieve a Lifecycle Greenhouse Gas Emission displacement of fifty percent (50%) compared to the baseline Lifecycle Greenhouse Gas Emissions.

Alternative Fuel: means any transportation fuel that is not California reformulated gasoline or a diesel fuel, including but not limited to, those fuels specified in the California Low Carbon Fuel Standard (Cal. Code Regs. tit. 17, § 95480.1(a)(12) (2010).).

CARB: means the California Air Resources Board or its successor agency.

Cellulosic Biofuel: means a renewable fuel derived from any cellulose, hemi-cellulose or lignin that has lifecycle greenhouse gas emissions that are at least sixty percent (60%) less than the Baseline Lifecycle Greenhouse Gas emissions (as set forth in the EPA RFS program (40 C.F.R. § 80.1401 (2012))).

Disqualified Biogas: means Gas that was initially determined by the parties upon delivery to be Biogas but subsequently becomes disqualified as Biogas because it is determined that it did not satisfy the requirements of the EPA Renewable Fuel Standard or the CARB LCFS at the time it was delivered or through some action of Seller after the time of delivery.

EPA Renewable Fuel Standard or EPA RFS: means the renewable energy program and policies established by the Environmental Protection Agency and published on March 26, 2010 (at 75 Fed. Reg. 14670) and which became effective on July 1, 2010.

Green Attributes: means any and all attributes, including Lifecycle Greenhouse Gas Emissions, that are associated with the use of Biogas as a Vehicle Fuel which are required to generate a RIN and LCFS Credit when the associated Biogas is used as a Vehicle Fuel.

Greenhouse Gas: means carbon dioxide (CO2), methane (CH4), nitrous oxide (N_20), hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, or any other substances or combination of substances that may become regulated or designated as Greenhouse Gases under any federal, state or local law or regulation, or any emission reduction registry, trading system, or reporting or reduction program for Greenhouse Gas emission reductions that is established, certified, maintained, or recognized by any international, governmental (including U.N., federal, state, or local agencies), or non-governmental agency from time to time, in each case measured in increments of one metric tonne of carbon dioxide equivalent.

Green Premium: means the price premium per MMBtu of Biogas added to the price of the Gas by virtue of the sale of RINs and LCFS Credits.

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Incremental LCFS Credits: means the number of LCFS Credits generated by displacing any fossil fuel natural gas or Renewable Biogas Vehicle Fuel with a carbon intensity of 45 gCO2e/MJ or greater with Biogas Vehicle Fuel from the Project(s), but excluding the LCFS Credits that would have been generated from fossil fuel natural gas or Renewable Biogas Vehicle Fuel with a carbon intensity of 45 gCO2e/MJ.

LCFS Credits Resale Price: shall be calculated by reference to the volume weighted average price of all LCFS Credits of the same annual and quarterly vintage sold by Buyer within the same calendar month excluding those LCFS Credits sold by Buyer under (i) any fixed price contracts in existence as of the date this Transaction Confirmation is signed by Buyer, and (ii) any contract with fixed pricing or a pre-determined formula for determining pricing (such contracts referred to herein as "**Predetermined Price Contracts**") a pro-rata portion of which is offered to Seller under the terms of this Transaction Confirmation, but rejected. In the event that Seller provides its prior written consent for Buyer to enter into a Predetermined Price Contract for the credits generated by Buyer hereunder, as described in this Transaction Confirmation, the prior clause shall not apply to any LCFS Credits sold under such Predetermined Price Contract and the LCFS Credits Resale Price for the LCFS Credits sold under the Predetermined Price Contract shall be the price specified in such fixed price agreement.

Lifecycle Greenhouse Gas Emissions: means the aggregate quantity of Greenhouse Gas emissions (including direct emissions and significant indirect emissions from land use changes), as determined by the EPA RFS or CARB, related to the full fuel lifecycle, including all stages of fuel and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished fuel to the ultimate consumer, where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential.

Low Carbon Fuel Standard Credits or LCFS Credits or LCFS: means credits generated and traded under the California Air Resources Board Low Carbon Fuel Standard, with each credit equal to one metric tonne of Carbon Dioxide reductions as compared to the baseline CO2 emissions under the Low Carbon Fuel Standard.

Project(s): means the Lakeside Pipeline LLC dairy gas RNG production project owned and operated by Seller located in Hanford, CA.

Renewable Biogas (RNG) or Biogas: means quantities, measured in MMBtus, of processed biogas that (i) meets the pipeline quality standards for pipeline gas agreed to between Seller and the owner of the pipeline into which such Gas is delivered by Seller and which is eligible to generate D Code 5 or D Code 3 Renewable Index Numbers under the Federal Renewable Fuel Standard when used as a Vehicle Fuel (or any other D Code RINs if the EPA determines that Renewable Biogas creates a different code of RIN); and (ii) contains all the environmental attributes associated with the use of a pipeline quality biogas-derived fuel as a Vehicle Fuel, including any credits or environmental commodities related to the reduction of Greenhouse Gas emissions.

Renewable Identification Number (RIN) is a number generated to represent a volume of renewable fuel as set forth in Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program, 75 Fed. Reg. 16484 (March 26, 2010) (codified at 40 C.F.R. § 80.1425 (2011); 40 C.F.R. § 80.1426 (2012).).

RINS Resale Price: shall be calculated by reference to the volume weighted average price of all RINS which are sold by Buyer that were generated within the same calendar month as the RINS generated from the Biogas sold hereunder, excluding those RINS sold by Buyer under (i) any Predetermined Price Contract in existence as of the date this Transaction Confirmation is signed; and (ii) any Predetermined Price Contract offered to Seller under the terms of this Transaction Confirmation, but rejected. In the event that Seller provides its prior written consent for Buyer to enter into a Predetermined Price Contract for the RINS generated hereunder, as provided in this Transaction Confirmation, the prior clause shall not apply to any RINS sold under a Predetermined Price Contract and the RINS Resale Price for the RINS sold under the Predetermined Price Contract shall be the price specified in such Predetermined Price Contract.

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Vehicle Fuel: means compressed natural gas (**CNG**) or liquefied natural gas (**LNG**) derived from Biogas and used in transportation vehicles.

2.0 Conditions Precedent

In the event that the following Condition Precedents have not been performed and documentation of such performance provided to the satisfaction of both Seller and Buyer on or before March 31, 2019, Buyer and or Seller may notify the other party in writing of its election to terminate this Transaction Confirmation. If notification is not received and the following Conditions Precedent have been performed and documentation of such performance is provided to the satisfaction of both Seller and Buyer subsequent to March 31, 2019, this Transaction Confirmation shall remain in full force and effect.

(A) Buyer and Seller acknowledge that the creation of RINs is contingent upon Seller obtaining the approval of the Environmental Protection Agency for the Project to be classified as a Project which produces a renewable fuel under the Renewable Fuel Standard Phase II eligible for generation of D Code 3 RINs when used as a Transportation Fuel (or any other D Code RINs if the EPA determines that Biogas creates a different code of RIN);

(B) Buyer and Seller acknowledge that creation of LCFS Credits is contingent upon the completion of a Method 2 pathway application and receipt of notification from the CARB that the Method 2 application is "deemed complete" by CARB under the Low Carbon Fuel Standard set forth in Title 17, California Code of Regulations in §§ 95480-95490. LCFS Credits will not be created retroactively prior to the date that the CARB deems the Method 2 pathway application to be complete unless and until CARB issues guidance or rules allowing such retroactive credit generation, in which case credits will be generated in accordance with such guidance or rules;

While Seller is in the process of obtaining the Environmental Protection Agency's approval, Seller may store Biogas generated by the Project in compliance with Buyer's Quality Assurance Program program. Buyer will purchase the stored Biogas under the terms of this Transaction Confirmation but only up to the MaxDailyQty each day.

If Seller terminates this contracts subsequent to March 31, 2019, Seller shall reimburse Buyer for any out-of-pocket expenses incurred related to this Transaction Confirmation.

3.0 Additional Terms and Conditions

(A) CARB and LCFS

(i) Buyer will work with Seller to register Buyer with the CARB as the "**Regulated Party**" under the CARB LCFS with respect to all Biogas sold to Buyer hereunder and sold by Buyer in California as a Vehicle Fuel.

(ii) Seller will cooperate with Buyer to ensure that the Biogas purchase and sale documents and product transfer documents meet the requirements of the LCFS regulation for the purpose of transferring Regulated Party status to Buyer for Biogas sold by Seller to Buyer hereunder.

(iii) Seller acknowledges that Buyer will act as a principal with respect to its own LCFS Credits and/or as an agent with respect to Seller's LCFS Credits and Seller hereby waives any claim against Buyer and its affiliates based on any conflict of interest or alleged conflict of interest of Buyer with respect to the manner, price or terms of the sale of any of the LCFS Credits generated hereunder. Buyer and its affiliates and control persons shall owe no fiduciary obligation to Seller with respect to the LCFS Credits generated and sold hereunder. Buyer's sole obligation with respect to the sale of LCFS Credits generated in this transaction shall be to use commercially reasonable efforts to sell all such credits generated on a quarterly basis or as otherwise approved by Seller. Seller acknowledges and agrees that the market for LCFS Credits is currently uncertain and there is no reliable or transparent LCFS credit price reporting service and little to no liquidity in the market for LCFS Credits. Buyer cannot and does not guaranty that the LCFS Credits can be sold at any price or at all. Between the fifteenth (15th) and eighteenth (18th) Day of each quarter, Buyer shall send Seller a statement detailing the (i) number of LCFS Credits sold during the prior quarter, (ii) the price at which such LCFS Credits were sold, (iii) the cumulative number of outstanding LCFS Credits remaining and (iv) the corresponding date such credits were generated

hereunder. Buyer shall provide Seller within the quarterly LCFS statement the amount of LCFS Credits generated during each calendar quarter.

(B) Buyer shall be responsible for identifying and contracting with a third party(ies) who will perform the following services for Buyer and Seller: (a) developing and soliciting approval of a fuel pathway from the Environmental Protection Agency ("**EPA**"); (b) registering the Seller and the RINs so as to comply with EPA policies, procedures and systems; and (c) tracking creation and transfer of the RINs to Buyer. Seller and Buyer will equally split the costs (50% / 50%) incurred by Buyer based on its services contract with the above described third parties.

(C) Maintenance of Records.

(i) Buyer shall maintain all records relevant to the purchase of Biogas from Seller, processing of such Biogas into a Vehicle Fuel, Vehicle Fuel sales, documentation of Vehicle Fuel production and sale in accordance with the requirements of the EPA RFS and records regarding the creation and sale of LCFS Credits in accordance with the requirements of the CARB.

(ii) Seller shall maintain accurate records relevant to the production and purchase and sale of Biogas to Buyer.

(iii) In the event that the EPA amends its regulations regarding which party is responsible for creation and sale of RINs or CARB amends its regulations regarding which party is responsible for creation and sale of LCFS Credits as related to the purchase and sale of Biogas for the production of Vehicle Fuel, the Parties agree to amend this Transaction Confirmation accordingly to change the recordkeeping and reporting obligations.

(D) Pursuant to Section 95484(a)(5)(D) of Title 17 of the California Code of Regulations for the Low Carbon Fuel Standard, Seller hereby transfers to Buyer, and Buyer hereby accepts the Low Carbon Fuel Standard (LCFS) regulated party status with respect to all Biogas sold by Seller to Buyer hereunder. In addition, in order to make such transfer effective as required under Section 95484(a)(5)(D), Seller, on a calendar quarter basis, shall provide the Buyer a production transfer document which shall prominently state the volume and average carbon intensity of the transferred fuel and that the Buyer is the regulated party for the acquired fuel and accordingly is responsible for meeting the requirements of the LCFS regulation with respect to the fuel.

(E) Buyer is obligated to create all LCFS Credits associated with the LCFS qualified Biogas purchases that Buyer is able to create consistent with the Low Carbon Fuel Standard set forth in Title 17, California Code of Regulations and to retain title to the LCFS Credits created by the purchase and sale of Biogas and conversion of such Biogas to a Vehicle Fuel.

(F) Buyer and Seller acknowledge that creation of LCFS Credits is contingent upon the completion of a Method 2 pathway application and receipt of notification from the CARB that the Method 2 application is "deemed complete" by CARB under the Low Carbon Fuel Standard set forth in Title 17, California Code of Regulations in §§ 95480-95490. LCFS Credits will not be created retroactively prior to the date that the CARB deems the Method 2 pathway application to be complete unless and until the CARB issues guidance or rules allowing such retroactive credit generation, in which case credits will be generated in accordance with such guidance or rules.

(G) For all Biogas sold and purchased hereunder, Seller represents and warrants that it has the rights to all Green Attributes and will convey to Buyer all Green Attributes for such Biogas. Seller represents and warrants that (i) the Biogas delivered to Buyer hereunder is from a project that produces pipeline quality Biogas, (ii) the Biogas shall be delivered to Buyer in accordance with the requirements of the Renewable Fuel Standard and Low Carbon Fuels Standard in order to preserve the Green Attributes, (iii) each facility producing the Biogas has provided to Seller and/or Buyer the Biogas fuel production facility registrations, and (iv) upon sale of the Biogas by Seller to Buyer, Seller shall transfer all Green Attributes associated with the production of such Biogas to Buyer.

(H) Both parties will promptly notify the other party in the event that any Biogas subject to this Transaction Confirmation is determined to be Disqualified Biogas, and Buyer shall have the right to terminate this Transaction Confirmation without liability and any such termination shall be considered a Seller Event of Default. In addition to all other remedies provided to Buyer under the Base Contract and hereunder, if Biogas sold by Seller and purchased

by Buyer hereunder was originally deemed to be Biogas and later becomes classified as Disqualified Biogas , Buyer will be entitled to a refund of any Green Premium payment made by Buyer to Seller for the Disqualified Biogas.

(I) Prior to delivery of the Biogas to Buyer, Seller or its designee shall provide to Buyer for submission to the EPA and CARB copies of any and all documentation required by the EPA or CARB to certify that the Biogas is an Advanced Biofuel or Cellulosic Biofuel that can generate D Code 3 RINS (or any other D Code RINs if the EPA determines that Renewable Biogas creates a different code of RIN) (with respect the EPA) and create a low carbon intensity pathway (with respect to CARB) for generation of Low Carbon Fuel Standard Credits (to the extent that sales of the Biogas Vehicle Fuel are contemplated in California). This documentation will include, but is not be limited to, all documentation required to certify that production and the transportation of the Biogas from its point of production to the Delivery Point is compliant with the transportation routing requirements ("pathing") of the EPA RFS and Low Carbon Fuels Standard. Such documentation may include, but is not limited to any affidavits, reporting or attestations required by the EPA or CARB, such as (i) assertions that the registration requirements as outlined by the Renewable Fuel Standard Registration Compliance Guidelines Engineering Review (40 C.F.R. § 80.1450 (2012).) have been met and (ii) documentation confirming that the Seller and Buyer are (to the extent necessary) registered under California state regulations (Cal. Code Regs. tit. 17, § 95484(a)(5)(A)1a (2010).), as regulated parties in the LCFS regulation.

(J) If Buyer becomes aware of a potential Predetermined Price Contract for either RINS or LCFS Credits, Buyer shall notify Seller and allow Seller the opportunity to elect to have some of the RINS or LCFS Credits, as applicable, generated and transferred to Buyer hereunder sold under the Predetermined Price Contract. Seller shall notify Buyer within 15 days after receipt of Buyer's notice whether Seller elects to have its RINS or LCFS Credits sold under the Predetermined Price Contract.

(K) Each party will provide the other party with such cooperation, additional documentation, certifications or other information as may be reasonably necessary to carry out the purposes of this Transaction Confirmation (including pursuant to any audit of this Transaction Confirmation by a Governmental Authority) and in order for title to the conveyed Green Attributes to vest in the Buyer in connection with the purchase and sale of the contract quantity of Biogas.

4.0 Process for Generation and Allocation of LCFS Credits

(A) Buyer Responsibilities and CARB LRT Account.

(i) Buyer shall maintain registration with CARB under the Low Carbon Fuel Standard set forth in Title 17, California Code of Regulations in §§ 95480-95490 as an "opt-in" regulated party under California Air Resources Board as set forth in Title 17, California Code of Regulations § 95480.3.

(ii) Buyer shall create all LCFS Credits associated with the LCFS qualified Biogas purchases hereunder that Buyer is able to create consistent with the Low Carbon Fuel Standard set forth in Title 17, California Code of Regulations and shall retain title to the LCFS Credits created by the purchase and sale of Biogas and conversion of such Biogas to a Vehicle Fuel.

(iii) Buyer or its agent will submit the LCFS Credit data and allocation to CARB between the fifteenth (15th) and twentieth (20th) Day of the month after the end of each calendar quarter (April 15-20, July 15-20, October 15-20 and January 15-20).

(B) Seller Responsibilities.

(i) Every month during the Delivery Period, Seller shall analyze the Biogas quantity sold and delivered to Buyer under this Transaction Confirmation and provide such data to Buyer.

(ii) Seller shall maintain all records relevant to the production and purchase and sale of Biogas.

(iii) Not later than the fifteenth (15th) Day of the month following the close of the calendar quarter (April 15, July 15, October 15 and January 15), Seller shall, with Buyer's assistance, prepare production transfer documents consistent with the CARB LCFS to validate the transfer of the regulated party status from Seller to the Buyer which shall prominently state the volume and average carbon intensity of the transferred fuel and that the recipient (the

Buyer) is the regulated party for the acquired fuel and accordingly is responsible for meeting the requirements of the LCFS regulation with respect to the acquired fuel.

(C) Buyer and Seller Responsibilities.

(i) Buyer and Seller shall work with Buyer's consultants to register with CARB and comply with the relevant regulatory provisions of the Low Carbon Fuel Standard set forth in Title 17, California Code of Regulations in §§ 95480-95490, including, but not limited to, pathway registration, LCFS credit generation, quarterly progress reporting and annual compliance reporting; and

(ii) Both parties shall maintain all records relevant to the purchase of Biogas from Seller, processing of such Biogas into a Vehicle Fuel, Vehicle Fuel sales, and documentation of Vehicle Fuel production in accordance with the requirements of the EPA RFS and CARB regarding the creation and sale of LCFS Credits.

(D) In the event that CARB amends its regulations for the creation and sale of LCFS Credits as related to the purchase and sale of Biogas for the production of Vehicle Fuel, Buyer and Seller shall work together and attempt to amend this Transaction Confirmation.

5.0 Process for Generation and Allocation of RINS.

(A) Buyer Responsibilities.

(i) Five days after the close of the calendar month or on another mutually agreeable day, during the Delivery Period, Buyer shall analyze the Biogas quantity sold and delivered to Buyer and converted to Vehicle Fuel by Buyer and determine how many RINs were created during the prior calendar month of delivery.

(ii) Based on the analysis in (i) above, Buyer shall prepare a report detailing the following

(A) Biogas supplied by Seller;
(B) Biogas converted to Vehicle Fuel, as CNG or LNG;
(C) Total Vehicle Fuel created from Biogas and dispensed as a Vehicle Fuel; and
(D) RINs to be created from Biogas purchased by Buyer from Seller and delivered as a Vehicle Fuel to Buyer's or its affiliates' customers.

(B) On each Monday, or other mutually agreeable day, during the Delivery Period, Seller shall facilitate access for Buyer or Buyer's agents to any and all records relevant to determining Biogas volumes produced during the prior week.

(C) At the end of each calendar month during the term of this Transaction Confirmation, Seller shall transfer to Buyer all RINs generated by it which are attributable to Biogas sold to Buyer under this Transaction Confirmation.

(D) In the event that the EPA amends its regulations for the creation of RINs as related to the purchase and sale of Biogas for the production of Vehicle Fuel, Buyer and Seller shall work together and attempt to amend this Transaction Confirmation.

6.0 Hierarchy

In the event of any inconsistency between the Base Contract and this Transaction Confirmation, the Transaction Confirmation shall govern.

7.0 Representations and Covenants of Buyer and Seller

(1) Buyer covenants and agrees that all Biogas purchased by Buyer hereunder shall be sold by Buyer to Buyer's or its affiliates' customers for use as a Vehicle Fuel.

(2) Seller represents that all Gas sold hereunder shall be Biogas, as defined above.

ID #260

(3) Each Party has the right, at its sole expense and during normal working hours, to examine the records of the other Party to the extent reasonably necessary to verify the accuracy of any statement, charge or computation made pursuant to this Transaction Confirmation including payment for RINs and LCFS Credits. If any such examination reveals any inaccuracy in any statement, the necessary adjustments in such statement and the payments thereof will be made promptly and shall bear interest at the prime rate as published by the Wall Street Journal, from the date the overpayment or underpayment was made until paid; provided, however, that no adjustment for any statement or payment will be made unless objection to the accuracy thereof was made within twelve (12) months of the date of the statement, charge or computation, and thereafter any objection shall be deemed waived.

8.0 Contract Price:

For Biogas Delivered, the "**Contract Price**" = (the applicable Gas Price) + (87.5% of the Combined Value of RINs and 85% Incremental LCFS Credits) – (50% of Cost of Transportation/Logistics).

Three (3) years after the date of commencement after the delivery period, the "Adjusted Contract Price" = (the applicable Gas Price) + (87.5% of the Combined Value of RINs and 87.5% Incremental LCFS Credits) – (50% of the Cost of Transportation/Logisitics).

The Contract Price or Adjusted Contract Price shall be paid as follows:

- The Gas Price for all MMBtus of Biogas delivered hereunder during any month shall be paid by the 25th day of the following month;
- The RIN Revenue received from RINS generated from the Biogas delivered hereunder shall be paid by the 25th day of the month following the delivery and payment by Buyer's or its affiliate's customer for such RINS; and
- The LCFS Revenue shall be paid on a quarterly basis by the 60th day of the calendar quarter following the quarter in which such LCFS Credits were generated.

For the purposes of this Section, the following terms shall have the following meanings:

(1) "**Gas Price**" shall mean the SoCal Citygate First of the Month Index ($/MMBtu) as published by Natural Gas Intelligence or any successor thereto.

(2) "**Combined Value of RINs and Incremental LCFS Credits**" shall mean the RIN Revenue plus LCFS Revenue realized by Buyer on the sale of the RINS and LCFS Credits generated from the Biogas purchased hereunder minus the LCFS Revenue Buyer would have generated if the Biogas sold as a Vehicle Fuel hereunder had been fossil fuel natural gas.

(3) "**Cost of Transportation/Logistics**" shall mean: all costs associated with transferring the Biogas from the Delivery Point to Buyer's or its affiliates' or its customers' CNG and LNG fueling facilities. Notwithstanding the foregoing, or anything to the contrary in this Transaction Confirmation, in the event the total Cost of Transportation/Logistics exceeds $0.50 per MMBtu, Seller shall be responsible for 100% of all Costs of Transportation/Logistics above $0.50. For example, if the Cost of Transportation/Logistics is $.055 per MMBtu, Buyer shall pay $0.25 and Seller shall pay $0.30.

(4) "**RIN Revenue**" shall mean the RINS Resale Price.

(5) "**LCFS Revenue**" shall mean the LCFS Credits Resale Price.

(6) "**Value of RINs**" shall mean the RIN Revenue realized by Buyer on the sale of RINs generated from the Biogas purchased hereunder.

9.0 Transportation

Buyer will enter into agreements ("**Gas Transfer Agreements**") for the transfer of Biogas from the Delivery Point to the Buyer's facilities where the Biogas will be either distributed as a Vehicle Fuel or liquefied to produce

Liquefied Natural Gas and then distributed as a Vehicle Fuel. The Gas Transfer Agreements will comply with the requirements of the Renewable Fuel Standard Phase II for the transmission of Biogas in a pipeline commingled with conventional natural Gas. The costs associated with such transfer and transportation shall be shared equally between Buyer and Seller based on the calculation of the Contract Price or Adjusted Contract Price as described above.

10.0 Onsite CNG Fueling Priority

If Seller builds an onsite CNG fueling station located at the Project facility, the RNG produced from the Project shall be prioritized into such CNG station before any delivery to Buyer.

11.0 Term of this Transaction Confirmation

The term of this Transaction Confirmation shall commence upon the execution of this Transaction Confirmation by Buyer and Seller and automatically terminate upon termination of the Delivery Period.

12.0 Intentionally Omitted

13.0 Additional Environmental Credits

In the event new environmental credits can be generated and monetized by the Biogas sold under this Transaction Confirmation ("**New Credits**"), the parties will apportion the revenue generated and registration costs associated with such New Credits in a substantially similar manner to how the RINs and LCFS Credits generated from the Biogas sold hereunder are apportioned.

Seller: **Lakeside Pipeline LLC**	Buyer: **Clean Energy Renewable Fuels, LLC**
By:	By:
Name: Daryl Maas	Name: Tyler Henn
Title: Manager	Title: Vice President
Date: 21 Feb 2018	Date: 2/21/18

ID #260

Bernard te Velde
Lakeside Pipeline LLC, co-owner
Lone Oak Farms #1, owner
Dixie Creek Dairy, owner
2911 Hanford Armona Rd
Hanford, CA 93230

6/12/2018

RE: Lakeside Pipeline Cluster – Letter of Commitment

To Whom It May Concern,

The purpose of this letter is to document my commitment to the Lakeside Pipeline Dairy Digester Cluster project.

My specific role in the project will be the project co-owner/financer, host dairy owner, and digester owner. As owner of Dixie Creek Dairy and Lone Oak Farms #1, I have elected to build a covered lagoon digester at both dairies. I am committed to funding these digesters and will provide the biogas from these digesters to the Lakeside Cluster pending an approved selection as a pilot project from the CPUC and Southern California Gas Company.

As one-third owner of Lakeside Pipeline LLC, I will work with my co-owners, Jacob de Jong and Daryl Maas, to make management decisions for the LLC and will provide my proportional share of the Lakeside Pipeline project financing as laid out in the application documents.

I am fully committed to fulfilling my role in the cluster and its biogas cleanup facility as detailed in the project narrative.

Sincerely,

Bernard te Velde
Lakeside Pipeline LLC
Co-Owner and Board Member

Jacob de Jong
Lakeside Pipeline LLC, co-owner
River Ranch Farms LLC, owner
High Roller Dairy, owner
6127 Jackson Ave
Hanford, CA 93230

6/12/2018

RE: Lakeside Pipeline Cluster – Letter of Commitment

To Whom It May Concern,

The purpose of this letter is to document my commitment to the Lakeside Pipeline Dairy Digester Cluster project.

My specific role in the project will be the project co-owner/financer, host dairy owner, and digester owner. As owner of River Ranch Farms and High Roller Dairy, I have elected to build a covered lagoon digester at both dairies. I am committed to funding these digesters and will provide the biogas from these digesters to the Lakeside Cluster pending an approved selection as a pilot project from the CPUC and Southern California Gas Company.

As one-third owner of Lakeside Pipeline LLC, I will work with my co-owners, Bernard te Velde and Daryl Maas, to make management decisions for the LLC and will provide my proportional share of the Lakeside Pipeline project financing as laid out in the application documents.

I am fully committed to fulfilling my role in the cluster and its biogas cleanup facility as detailed in the project narrative.

Sincerely,

Jacob de Jong
Lakeside Pipeline LLC
Co-Owner and Board Member

MAAS ENERGY WORKS

3711 Meadow View Dr.
Suite 100
Redding, CA 96002
www.maasenergy.com

Daryl Maas, CEO
Maas Energy Works, Inc.
3711 Meadow View Dr. Ste 100
Redding, CA 96002

June 19, 2018

California Public Utilities Commission (CPUC)
300 Capitol Mall
Sacramento, CA 95814

*RE: Lakeside Pipeline – Letter of Commitment*To Whom It May Concern,

The purpose of this letter is to document my commitment to the above pipeline project, and individual dairy digesters.

My specific role in the project will be the project manager and project co-owner. As project manager, I oversee all members of the project team to bring about the project's objectives as described in the Project Narrative and Work Plan. I will be primarily responsible for CPUC Pilot Project compliance, utility pipeline interconnection, conceptual project design, permit applications including CEQA, equipment and contractor bids, greenhouse gas emission reduction design, project scheduling, long-term facility operations, and overall project team coordination. Although the cluster's biogas cleanup equipment, CNG fueling station, and other shared infrastructure is not technically part of the Pilot Project infrastrcutre budget, I am also committed to fulfilling my role in the cluster and its hub as detailed in the project narrative.

I am prepared to facilitate project development immediately; and, in fact, have already initiated several major elements of the project, as detailed in the Project Narrative. I am fully committed to fulfilling my role in the cluster and it's biogas cleanup facility as detailed in the project narrative.

I will work at the behest of the Project Owner to coordinate the rest of the project team. I am also committed to serving as one of the owners of Lakeside Pipeline LLC—a company created and owned by me and two of the participating dairymen. As co-owners and managers, myself, Jack de Jong and Bernard te Velde will make management decisions for the LLC.

Sincerely,

Daryl Maas
Chief Executive Officer

June 11, 2018
File No. 90000011.06

Maas Energy Works Inc.
3711 Meadow View Dr., Suite 100
Redding, CA 96002

Subject: Lakeside Pipeline Dairy Digester Cluster Project
Letter of Commitment

To Whom It May Concern:

The purpose of this letter is to document SCS Engineers commitment to the Lakeside Pipeline Dairy Digester Cluster Project planned by Lakeside Pipeline LLC in Hanford County and Tulare County.

Our role in the project would be the design-build contractor for the biogas conditioning and cleanup facility that will be located 1,600 feet North of the intersection of 7th Ave and Jersey Ave in Hanford, CA. Our firm would be responsible for designing a system sized to process up to 1,887 SCFM of raw biogas and deliver it to the utility pipeline meeting all SoCal Gas Rule 30 requirements. As design-build contractor, we will provide the design, full construction, commissioning, and post-commissioning support though operational and maintenance.

After design-build contract execution, we will provide stamped construction drawings to all sub-contractors and permitting agencies, and will supply as-built drawings upon completion. We are prepared to facilitate project development immediately.

Sincerely,

Jeffrey L. Pierce, P.E.
Senior Project Director
SCS Energy

HARTMAN ENGINEERING

Craig Hartman, P.E.
Hartman Engineering
113 N. Church St, Suite 521
Visalia, CA 93291

June 20, 2018

California Public Utilities Commission (CPUC)
300 Capitol Mall
Sacramento, CA 95814

RE: Lakeside Pipeline – Letter of Commitment

To Whom It May Concern,

To Whom It May Concern,

The purpose of this letter is to document my commitment to the Lakeside Pipeline Project, including the following list of dairies: Decade Dairy/Richard Westra Dairy, Clearlake Dairy, Dixie Creek Ranch, High Roller Dairy, Lone Oak Farms #1, River Ranch Dairy, Double L Cattle, Poplar Lane Dairy and Lakeside Dairy.

I am committed to my role as the lead digester engineer for this project and as such will be primarily responsible for technical project design, water board submittals, and environmental compliance. After contract execution, I will provide construction quality assurance work as needed, and supply engineering support to the various contractors on site.

I will provide stamped construction drawings to builders and permitting agencies, and will supply as-built drawings upon completion. I am prepared to facilitate project development immediately; and, in fact, have already initiated several major elements of the project, as detailed in the grant application narrative.

Sincerely,

Craig Hartman, P.E.

President

111 Mission Ranch Blvd., Suite 140
Chico, CA 95926-2267
Tel: (866) 776-6200

www.ppeng.com

June 21, 2018

California Public Utilities Commission
300 Capitol Mall
Sacramento, CA 95814

RE: Lakeside Pipeline LLC - Letter of Commitment for Engineering Services, SB 1383 Dairy Pilot Projects

To Whom It May Concern:

The purpose of this letter is to document the commitment of Provost & Pritchard Consulting Group (Provost & Pritchard) to the Lakeside Pipeline Cluster Project. If funding for the project is secured, Provost & Pritchard will negotiate an engineering contract with Lakeside Pipeline LLC for engineering services associated with the project. Upon successful negotiations and execution of a contract with Lakeside Pipeline LLC, we will commence work on the project.

Provost & Pritchard's project manager, Kenneth K. Shuey, P.E. is committed to his role as the lead engineer for this project and as such will be primarily responsible for Provost & Pritchard's contractual role in technical project design, Regional Water Quality Control Board submittals, and environmental permitting as defined by the contract we enter into with Lakeside Pipeline LLC. After contract execution, we will provide permitting, regulatory coordination, preliminary and final design, construction quality assurance work, and engineering services during construction and construction observation as contracted. Our staff includes civil and agricultural engineers, construction managers, geologists, planners, CAD technicians, surveyors, environmental specialists, marketing specialists, and GIS technicians. We have many years of experience in the dairy industry and digester projects.

We will provide stamped construction drawings to Lakeside Pipeline LLC for distribution to contractors and permitting agencies per our contract. We will supply record drawings upon completion of the construction project per our contract (based on information provided by the contractor and Provost & Pritchard's observations during construction).

Provost & Pritchard is prepared to facilitate project development immediately after executing a contract with Lakeside Pipeline LLC. We have adequate technical and administrative staff to complete the project.

Sincerely,
PROVOST & PRITCHARD CONSULTING GROUP

Kenneth K. Shuey, RCE 33558
Project Manager

Linda G. Sloan, PG/CHG
Vice President

4675 MacArthur Court, Suite 800
Newport Beach, California 92660 USA
949.437.1258 fax: 949.612.1894

www.CleanEnergyFuels.com

Tyler J. Henn
Vice President, Clean Energy Renewables

Clean Energy

February 21, 2018

Daryl Maas
Maas Energy Works, Inc.
3711 Meadow View Drive, #100
Redding, CA 96002

Dear Daryl,

This letter serves to document Clean Energy's (CE) willingness to support the Hanford-Lakeside Dairy Digester cluster, developed by Maas Energy Works Inc (MEW). CE is the largest operator of compressed natural gas (CNG) fueling stations in North America. Our company has established a critical position in providing renewable natural gas (RNG) to the California CNG vehicle fueling market. In 2017, CE delivered 68mm gasoline gallon equivalents to California which represented over 60% of the total California RNG supply market. Under separate agreements between MEW and CE which are subject to their own terms and conditions, CE has agreed to offtake the project's pipeline-injected RNG for delivery to compressed natural gas CNG fueling stations operated and/or supplied by CE. These stations serve vehicles that are usually fueled by diesel prior to transitioning fleets to CNG.

Additionally, CE is willing to support the installation and operation of the cluster's on-site CNG fueling station. Our company has extensive experience in design, installing, and operating such stations for third parties. After installation, we can provide on-call support or full-service operation of the facility. We look forward to working with Lakeside Pipeline LLC and Maas Energy Works LLC to bring clean, renewable dairy fuels to the California Central Valley.

Best regards,

Tyler J. Henn

North America's leader in clean transportation

85 Pascon Court
Gaston, SC 29053
(803) 551-5700
(803) 551-5701 fax
www.efiusa.com

June 18, 2018

California Public Utilities Commission (CPUC)
300 Capitol Mall
Sacramento, CA 95814

RE: Lakeside Pipeline – Letter of Commitment

To Whom It May Concern,

The purpose of this letter is to document Environmental Fabrics, Inc.'s (EFI) commitment to the Lakeside Pipeline Cluster project. EFI's specific role in the project will be the lagoon liner and digester cover installation contractor for each participating dairy's digester. We will fabricate and install a High-Density Polyethylene (HDPE) double liner for the project's digester pond, meeting all Water Board Tier 1 specifications. We will also install an HDPE cover over the pond creating a complete biogas collection system. The participating dairies to date include:

- Decade Centralized Digester
- Clear Lake Dairy
- Dixie Creek Dairy
- Double L Cattle
- High Roller Dairy
- Lakeside Dairy
- Lone Oak Farms #1
- Poplar Lane Dairy
- River Ranch Farms

I have provided the project team with design specifications and cost estimates for this scope of work. We are prepared to proceed with construction as soon as the cluster is chosen as a pilot project. EFI will execute a contract for our work with project owner and will coordinate our tasks as directed by the project manager, Daryl Maas of Maas Energy Works, and digester lead engineer, Craig Hartman of Hartman Engineering; as well as with the rest of the project team.

EFI supports the hiring of a local workforce and will strive to fill any available positions throughout the project with residents of the surrounding community. EFI employees engaged on this contract will utilize HDPE installation techniques. Those with the necessary aptitude have the opportunity to achieve Certified Welder Technician credentials from the International Association of Geosynthetic Installers after approximately 1-2 years of experience. EFI maintains a crew to service California's Central Valley and offers long term employment for dedicated employees.

Please contact me if you have any questions.

Dennis Shanklin
Environmental Fabrics, Inc.

ELECTRIC INNOVATIONS INC.

Ca Lic# 907032
3711 Meadowview Dr.
Suite 100
Redding, CA 96002

o. 530-222-3366
c. 760-717-1605

June 21, 2018

California Public Utilities Commission (CPUC)

300 Capitol Mall
Sacramento, CA 95814

RE: Lakeside Pipeline Project – Letter of Commitment

To Whom It May Concern,

The purpose of this letter is to document my commitment to Lakeside Pipeline Project.

My specific role in the project will be the electrical contractor providing automation, networking, and mechanical piping and equipment. We will provide design support to the Project Manager and Project Engineer during the construction process. We will also provide planning information to ensure that all electrical equipment will be safely and efficiently installed and operated.

We are prepared to proceed with design immediately; although we can accommodate a later schedule, if necessary.

We will execute a contract for our work with the project owner and will coordinate our tasks as directed by the project manager and developer, Daryl Maas of Maas Energy Works, as well as with the rest of the project team.

This project will employ 6-7 Electrician Trainees that will gain hours towards Electrical Journeyman certification with the California Department of Industrial Relations.

Sincerely,

Ted Thompson
Owner

Daryl R. Maas
(210) 527-7631
daryl@maasenergy.com

Qualifications:

Industry:

Daryl Maas possesses more direct experience as a dairy digester developer-owner-operator than anyone in the US biogas industry. He has served as the start-to-finish developer of thirteen successful digester projects, all of which are still in operation. He continues to oversee continuous operations while retaining ownership in seven—giving him unique comprehensive experience not only developing but also owning and operating these facilities. Daryl currently directs over 30 employees or contractors and interacts with 23 partner dairy farms supplying manure to his digesters.

Environmental:

As an officer and owner responsible for biogas facility regulatory compliance, Daryl has procured digester air permits in six separate air permitting districts in three states. He ensures continuous compliance with a multitude of water quality, solid waste, zoning, and other regulations. He has worked with multiple regulatory agencies and state legislatures to design, evaluate, and modify digesters in order to comply with all environmental guidelines.

Financial:

All the aforementioned biogas facilities were built with over $65,000,000 in private capital, grant funding, and government guaranteed loans. Daryl has monetized over half a million tons of greenhouse gas reductions (aka "Carbon Credits)", Daryl has intricate knowledge of biogas facility finance and an excellent capacity to analyze the financial and operation feasibility of new digester projects.

Professional Experience

2010-Present: Founder and CEO of Maas Energy Works LLC

Maas Energy Works is a California-based renewable energy project development, construction management, and operations company, specializing in anaerobic digestion. Directs all new project development and existing project operations, including design, permitting, regulatory compliance, remote management, project finance, and personnel. Overseas Maas Motor Works engine and automation fabrication facility with over $4,000,000 in current orders. Oversees 21 employees and contractors in the operation of 8 renewable energy digester facilities and the active development of 34 other biogas facilities in California. Interacts directly and actively with multiple California air, water, and utility jurisdictions regarding multiple digester designs active and under development.

2007- 2017: Co-Founder and CEO of Farm Power Northwest LLC

A Washington and Oregon based renewable energy project development and operations company specializing in anaerobic digestion or agriculture and organic waste. Lead new project development including design, permitting, and construction management. Oversaw all operations at five renewable energy facilities with a combined electrical capacity of 4.25MW; processing manure from 17 dairy farms and dozens of organic waste sources. Directed nine employees and contractors in all operations, improvements, and regulatory compliance. Coordinated operations with utilities, farmers, investors, community groups, and regulatory agencies. An owner of the company after term as CEO.

2008- 2017: Intelligence Officer (O-4), Washington Air National Guard, United States Air Force

Assigned to Washington Air National Guard Western Air Defense Sector, McChord Field, Washington. Provides intelligence support to homeland defense of US airspace and surge capacity directing two intelligence officers in 24-hour operations in times of national emergency.

2005-2007: Branch Chief and Officer in Charge (O-3), Effects-Based Targeting Division, Air Force

Intelligence Analysis Agency, Lackland AFB, TX. Supervised nine military personnel and seven contractor analysts in the production of web-based intelligence materials. Served as Officer in Charge of 70-member intelligence analysis division, responsible for unit military duties and alternate division chief in absence of program manager and deputy. Project manager for unit's first ever installation of classified communication connectivity to new, off-base intelligence facility.

2003-2005: Chief of Intelligence (O-3), 8th Special Operations Squadron, Duke Field, FL.

Supervised staff of three and ensured readiness of all intelligence personnel and information systems supporting over 100 squadron members. Served two combat deployments as detachment of chief of intelligence, supervising staff of two supporting combat operations in support of Operation ENDURING FREEDOM actions in Afghanistan. Provided all aircrew mission intelligence and force protection intelligence support to the commander. Served an interpreter and liaison with various Latin American delegations.

2002-2003: Intelligence Officer (O-2), 8th Special Operations Squardon, Duke Field, FL.

Provided training and mission intelligence to over 100 squadron members. Briefed Operation IRAQI FREEDOM current intelligence to squadron and wing leadership. Served one combat deployment as detachment of chief of intelligence, supervising staff of two supporting combat operations in as part of Operation ENDURING FREEDOM actions in Afghanistan.

Education and Training

2005: AF Squadron Officer School (Commandant's Award for Outstanding Graduate)
2003: AF Special Operations Command Intelligence Formal Training Unit (Distinguished Graduate)
2002: Air Force Intelligence Officer Training (Distinguished Graduate)
2002: Master of Arts, University of Texas at Austin
2000: Bachelor of Sciences, United States Air Force Academy (Distinguished Graduate)
1998: Certificate, American Institute of Political and Economic Systems, Georgetown University

Academic Awards

2000 Air Force Historical Association Annual Air Force Academy Award
2000 US Air Force Academy Bong Award for the Outstanding Graduate in Military History
2000 USAF Academy Wolfe Fellowship for the Outstanding Graduate in Humanities Division

Professional Awards

2017 Air Force Meritorious Service Medal
2015 California Energy Commission awarded the Leadership Award in Waste Management from Green Technology for the Pixley Biogas Anaerobic Digester Project – Developed by Maas Energy Works
2009 Northwest Business Monthly Business of the Year (Co-Founder)
2007 Air Force Commendation Medal
2006 HQ Air Intelligence Agency Company Grade Officer of the Quarter
2005 Air Force Squadron Officer's School, Class 2005-01, Commandant's Leadership Award
2005 Air Force Squadron Officer School, Flight B-24, Outstanding Contributor Award
2004 Air Force Special Operations Command selectee, National Military Intelligence Association, MG Jack E. Thomas Award for Outstanding Active Duty Intelligence Professional

Foreign Languages

Spanish (fluent)
French (limited)

Maas Energy Works Digester Projects List

MEW Role	Project	Location	Project Cost	Online Since	kW	Total Engine Hours	Status	Utility	Digester Technology	Biogas Use Technology
Developer, Operator, Owner	Farm Power Rexville	Skagit County Washington	$3,500,000	Aug, 2009	750	69,280	Operational	Puget Sound Energy	Mixed Plug Flow	Guascor SFGLD-560 (1200 RPM) Lean Burn ICE
Developer, Operator, Owner	Farm Power Lynden	Whatcom County Washington	$4,200,000	Dec, 2010	750	59,425	Operational	Puget Sound Energy	Mixed Plug Flow	Guascor SFGLD-560 (1200 RPM) Lean Burn ICE
Developer, Operator, Owner	Farm Power Tillamook	Tillamook County Oregon	$4,100,000	Apr, 2012	995	41,285	Operational	Tillamook People's Utility District	Mixed Plug Flow	Guascor SFGM-560 (1800 RPM) Lean Burn ICE
Developer, Operator, Owner	Rainier Biogas	King County Washington	$4,400,000	Dec, 2012	995	40,388	Operational	Puget Sound Energy	Mixed Plug Flow	Guascor SFGM-560 (1800 RPM) Lean Burn ICE
Developer, Operator, Owner	Farm Power Misty Meadow	Tillamook County Oregon	$5,000,000	Mar, 2013	750	35,601	Operational	Tillamook People's Utility District	Mixed Plug Flow & Covered Tank	Guascor SFGLD-560 (1200 RPM) Lean Burn ICE
Developer, Operator, Owner	Van Warmerdam Digester	Sacramento County California	$1,700,000	May, 2013	600	14,854	Operational	Sacramento Municipal Utility District	Covered Lagoon	Guascor SFGM-360 (1800 RPM) Lean Burn ICE with SCR
Developer, Operator	Pixley Biogas Digester	Tulare County California	$9,300,000	Mar, 2018	N/A	N/A	Undergoing Repairs	Pacific Gas & Electric	Mixed Plug Flow	5MW Turbine w/ Duct Burner Co-firing to create process steam
Developer, Operator	Pacific Rim Digester	Tulare County California	$2,500,000	Nov, 2014	2000	24,636	Operational	Pacific Gas & Electric	Covered Lagoon	Guascor SFGLD-560 (1800 RPM) Lean Burn ICE with SCR
Developer, Operator, Owner	Van Steyn Digester	Sacramento County California	$1,400,000	Sep, 2015	225	9,135	Operational	Sacramento Municipal Utility District	Covered Lagoon	Guascor SFGLD-180 (1800 RPM) Lean Burn ICE with SCR
Developer, Operator	Open Sky Digester	Fresno County California	$4,000,000	Aug, 2016	1,600*	7,714	Operational	Pacific Gas & Electric	Covered Lagoon	Guascor SFGLD-480 (1800 RPM) Lean Burn ICE with SCR
Developer, Operator	Verwey Hanford Digester	Hanford County California	$8,000,000	Sep, 2016	3,000*	9,172	Operational	Pacific Gas & Electric	Covered Lagoon	1x Guascor SFGLD-560 & 2x CAT G3516A Lean Burn ICEs with SCR
Developer, Operator	Verwey Madera Digester	Madera County California	$5,500,000	May, 2017	1,400*	3,878	Operational	Pacific Gas & Electric	Covered Lagoon	1x Guascor SFGLD-480 and 1x CAT G3516A Lean Burn ICEs with SCR
Developer, Operator	Tevelde Tipton Digester	Tulare County California	$1,900,000	June, 2017	800	2,627	Operational	Southern California Edison	Covered Lagoon	Guascor SFGLD-480 (1800 RPM) Lean Burn ICE with SCR
Developer, Operator	Van Beek Brothers Dairy Digester	Tulare County California	$3,500,000	Jul, 2018	800	0	Under Construction	Southern California Edison	Covered Lagoon	Guascor SFGLD-480 (1800 RPM) Lean Burn ICE with SCR
Developer, Operator	Circle A Digester	Tulare County California	$2,500,000	May, 2018	fuel	N/A	Under Construction	SoCal Gas	Covered Lagoon	Process Fuel - Low Carbon Ethanol Production (initial), SoCalGas pipeline injection (final)
Developer, Operator	Vander Eyk Digester	Tulare County California	$3,000,000	Jun, 2018	fuel	N/A	Under Construction	SoCal Gas	Covered Lagoon	Process Fuel - Low Carbon Ethanol Production (initial), SoCalGas pipeline injection (final)
Developer, Operator	Legacy Ranch Digester	Tulare County California	$3,500,000	Aug, 2018	fuel	N/A	Under Construction	SoCal Gas	Covered Lagoon	Process Fuel - Low Carbon Ethanol Production (initial), SoCalGas pipeline injection (final)
Developer, Operator	Williams Family Dairy Digester	Tulare County California	$4,025,000	Dec, 2018	fuel	N/A	Under Construction	SoCal Gas	Covered Lagoon	Process Fuel - Low Carbon Ethanol Production (initial), SoCalGas pipeline injection (final)
Developer, Operator	Pixley Dairy Digester Pipeline Project	Tulare County California	$3,480,236	Dec, 2018	fuel	N/A	Under Development	SoCal Gas	Covered Lagoon	Process Fuel - Low Carbon Ethanol Production (initial), SoCalGas pipeline injection (final)
Developer, Operator	K&M Visser Dairy Digester Pipeline	Tulare County California	$3,326,975	Oct, 2018	fuel	N/A	Under Development	SoCal Gas	Covered Lagoon	Process Fuel - Low Carbon Ethanol Production (initial), SoCalGas pipeline injection (final)
Developer, Operator	Joseph Gallo Farms	Merced County, California	$1,600,000	Jun, 2017	400 bhp	N/A	Operational	Pacific Gas & Electric	Upgrade	Install 500 boiler horsepower Absorption Chiller
Developer, Operator	Giacomini	Marin County, California	$250,000	Jul, 2016	80	N/A	Operational	Pacific Gas & Electric	Engine Retroift	Guascor SFLGD-180 (1800 RPM) Lean Burn ICE
Developer, Operator	New Hope	Sacramento County California	$1,500,000	Dec, 2018	450	N/A	Procurement	Sacramento Municipal Utility District	Restart/Refurbish	MAN (1800 RPM) Lean Burn ICE with SCR
Developer, Operator	Hillarides	Tulare County California	$1,200,000	Aug, 2018	750	N/A	Procurement	Southern California Edison	Engine Replacment	Guascor SFGLD-560 (1200 RPM) Lean Burn ICE with SCR

* Expansion in Progress

MAAS ENERGY WORKS

1 SCS QUALIFICATIONS/EXPERIENCE

A summary of SCS's RNG qualifications/experience can be found on the attached table. Particularly relevant projects are highlighted below.

POINT LOMA BENEFICIAL USE OF DIGESTER GAS PROJECT

The Beneficial Use of Digester Gas (BUDG) Project is an RNG plant located at the Point Loma Wastewater Treatment Plant in San Diego, California. The RNG plant converts digester gas (DG) into RNG. DG has a high CO_2 fraction, is saturated with moisture and contains H_2S, siloxanes and other volatile organic compounds. The RNG is delivered into San Diego Gas and Electric's (SDG&E's) pipeline and meets SDG&E's stringent Rule 30 standards for pipeline quality gas for siloxane. The plant has not had one instance of violating SDG&E's stringent Rule 30 standard for siloxane. It was the first, and is currently only one of two, projects in California delivering RNG into a natural gas pipeline. The RNG plant has an inlet capacity of 1,100 scfm and a product gas capacity of 850 mmBtu/day. The RNG plant incorporates the following technologies:

- DG refrigeration;
- DG compression with flooded-screw compression;
- SulfaTreat for H_2S removal;
- Membranes for CO_2 removal;
- Thermal oxidizer; and
- 0.3-megawatt (MW) fuel cell to satisfy some of the plant's power requirements.

SCS delivered the RNG plant on a design/construct basis. SCS had total responsibility for the project, including the SDG&E metering/monitoring station and interconnecting pipeline. SCS also conducted pipeline pre-injection RNG sampling and analysis to confirm compliance with SDG&E Rule 30 pipeline quality gas standards. The plant began commercial operation in March 2012. SCS has operated the plant since that time, on a contract basis.

LA FARFANA DIGESTER GAS METHANIZATION PROJECT

The La Farfana Methanization Project utilizes DG which is produced at Santiago, Chile's La Farfana Wastewater Treatment Plant. The project proceeded in two phases.

In the Phase I project, the DG was compressed, dehydrated, delivered by dedicated pipeline to a remote site, and then cleaned to reduce H_2S and volatile organic compounds to very low levels for use as feedstock for a town gas manufacturing plant. The Phase I project incorporated compression, refrigeration, Darco media for H_2S removal and activated carbon polishing. SCS designed the Phase I project and assisted with equipment procurement and startup. The Phase I project commenced operation in October 2008.

A Phase II project recently completed upgrades the Phase I project to produce pipeline quality RNG, by adding CO_2 removal, additional compression and a thermal oxidizer. SCS completed a feasibility study to select the CO_2 removal technology to produce RNG, to estimate RNG plant construction, operation/maintenance costs, power consumption and plant performance. SCS was then authorized to move forward with the design of the project. SCS also was responsible for providing assistance in equipment procurement, construction oversight and startup. The RNG project has an inlet capacity of 2,300 scfm and a product gas capacity of 2,000 mmBtu/day.

UC SHREVEPORT BIOMETHANE FACILITY

The University of California (UC) Shreveport RNG Facility will consist of an RNG plant, located at the Woolworth Road Landfill in Shreveport, Louisiana, which will convert landfill gas into RNG for injection into the Center Point Energy natural gas pipeline. SCS is the design/construct contractor for the project. Construction is currently underway.

The RNG plant has an inlet capacity of 2,650 scfm and a product gas capacity of 1,850 mmBtu/day. The RNG plant incorporates the following technologies:

- Landfill gas refrigeration;
- Landfill gas compression with flooded-screw compressor;
- Provisions for addition of SulfaTreat for H_2S removal;
- Membranes for CO_2 removal;
- Product gas compressor (450 psig); and

- Regenerative thermal oxidizer.

SCS completed a feasibility study to select the preferred process chain for the RNG plant. The plant will begin commercial operation in June 2018.

FRESNO DIGESTER GAS CONDITIONING SYSTEM

The Fresno Digester Gas Conditioning System (DGCS) is an RNG plant, located at the City of Fresno's Fresno/Clovis Wastewater Reclamation Facility in Fresno, California. The Fresno DGCS converts DG into RNG. DG has a high carbon dioxide fraction, is saturated with moisture and contains H_2S, siloxanes and other volatile organic compounds. The RNG is used to fuel on-site combustion turbines. The RNG plant was required to meet Pacific Gas & Electric Company (PG&E) pipeline quality gas standards, even though the product gas was not delivered into a pipeline, because the combustion turbines required pipeline quality gas. The RNG plant has an inlet capacity of 1,500 scfm and a product gas capacity of 1,100 mmBtu/day. The RNG plant incorporates the following technologies:

- DG refrigeration;
- DG compression with flooded-screw compression;
- SulfaTreat for H_2S removal;
- Membranes for CO_2 removal; and
- TOX.

SCS designed and constructed the RNG plant on a design/construct basis. SCS was also responsible for securing the air permit for the project. The project began commercial operation in April 2012. SCS has provided maintenance services for the facility since that time, on a contract basis.

The City of Fresno recently engaged SCS-E to design a 650 psig product gas compressor and a 2.6-mile pipeline to allow injection of the RNG into a PG&E pipeline. The project will allow the City to capture the full value of the RNG through off-site sale of the RNG. The City will then fuel the combustion turbines with natural gas.

CALGREN DIGESTER GAS UTILIZATION PROJECT

SCS is currently designing a 2,500 scfm DG-to-RNG plant in Pixley, California. The product gas capacity is 2,100 mmBtu/day. In the initial phase of this project, the RNG will be used to fire a combustion turbine, because the combustion turbine requires pipeline quality gas. The feedstock for the digester is dairy manure. The RNG plant will use the following technologies:

- Liquid scrubber for H_2S removal;
- DG refrigeration;
- Activated carbon treatment;
- DG compression with flooded-screw compression;
- Membranes for CO_2 removal; and
- Product gas compressor (to 250 psig).

The RNG plant is being configured to allow RNG pipeline injection, as an alternative to on-site use, through a future project. SCS-E will also provide the SCADA system on a turnkey basis.

Table 1. SCS Energy's RNG Plant Experience											
Project Name and Location	**Design**	**Construct**	**Operate**	**Operations Consulting**	**Due Diligence**		**Selexol**	**Membrane**	**CO2 PSA**	**N2 PSA**	**Type**
Current RNG Plant Design and Construction Assignments											
Woolworth, LA (2,650 scfm)	X	X	X					X			LFG
Volusia, FL (2,300 scfm)	X	X	X					X		X	LFG
Mid-Valley, CA (4,200 scfm)	X	X	X					X		X	LFG
Skyline, TX (5,000 scfm)	X							X		X	LFG
New Holland, PA (8,500 scfm)	X							X		X	LFG
Southside, IN (4,000 scfm)	X							X		X	LFG
Pixley, CA (2,500 scfm)	X							X			DG
Jerome, ID (1,400 scfm)	X							X			DG
Western Texas (1,350 scfm)	X							X			DG
Constructed RNG Plants											
Turnkey, NH (6,000 scfm)	X	X	X						X		LFG
Fresno, CA (1,500 scfm)	X	X	X					X			DG
Point Loma, CA (1,100 scfm)	X	X	X					X			DG
La Farfana, Chile (2,300 scfm)	X							X			DG
Outer Loop, KY (5,000 scfm)	X							X		X	LFG
McCommas Bluff, TX	(X)	(X)	X		X				X		LFG
Greentree, PA					X			X		X	LFG
Oak Grove, GA			X		X			X			LFG
Live Oak, GA					X			X			LFG
Cedar Hills, WA				X	X			X		X	LFG
Deffenbaugh, KS					X		X				LFG
Laurel Highlands, PA				X				X			LFG
Shade, PA				X				X			LFG
South Alleghenies, PA				X				X			LFG
Imperial, PA					X			X			LFG
Rumpke, OH				X	X				X		LFG
Fresh Kills, NY				X			X				LFG
Monroeville, PA					X			X			LFG
Valley, PA					X			X			LFG
North Shelby, TN					X				X		LFG
Fort Bend, TX					X		X				LFG
Greenwood Farms, TX					X		X				LFG
McCarty Road, TX				X			X				LFG

Notes:

1. (X) indicates plant improvements, not the entire plant.
2. Operations Consulting includes either ongoing consulting, single or multiple issue optimization studies, or troubleshooting specific problems.
3. Due Diligence includes detailed plant reviews in support of plant acquisitions, financing, or for other purposes.

HARTMAN ENGINEERING

OBJECTIVE: SUSTAINING CALIFORNIA AGRICULTURE NATURALLY

GOAL:

We don't consider what we do at Hartman Engineering to be "work". Rather we are pursuing our passion of a better future for our family and friends in the dairy business. We were all born and raised here in the valley, where at one point there were nearly 2 million dairy cows. As the human population continues to grow, so does the need for healthy, locally grown food. Agriculture will continue to be pressured to create more with less.

MISSION: PROVIDE CLIENTS LEADERSHIP, INNOVATION AND TECHNOLOGY TO ACHIEVE BOTH ENVIRONMENTAL AND BUSINESS GOALS

EXPERIENCE:

Our peers tell us our team is one of the most experienced in the state at designing and managing construction of dairy digesters. We have worked for the top developers in the state to successfully perfect the California Digester.

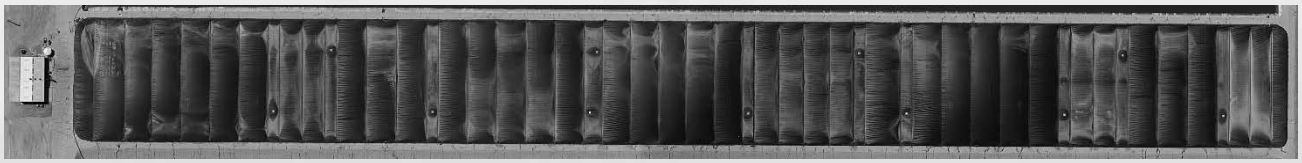
TEAM:

Craig Hartman, Principal Engineer
Fred Mason, Professional Geologist
Sam Alexander, Assistant Engineer
Ryen Simpson, Assistant Engineer
Bob Barron, Assistant Engineer

Lanny Simpson, Construction Manager
Ryan Runyon, Construction Manager
Kevin Pope, Environ. Meter/Controls
Dan Hensley, Efficiency & Programming
Laurissa Hartman, Administration

INNOVATION:

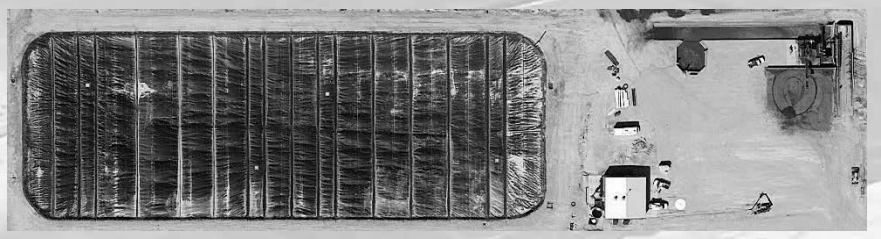
We have many new improvements and modifications from our experience on previous projects and are ready to implement these into our design to kick off the California Digester version 2.0.



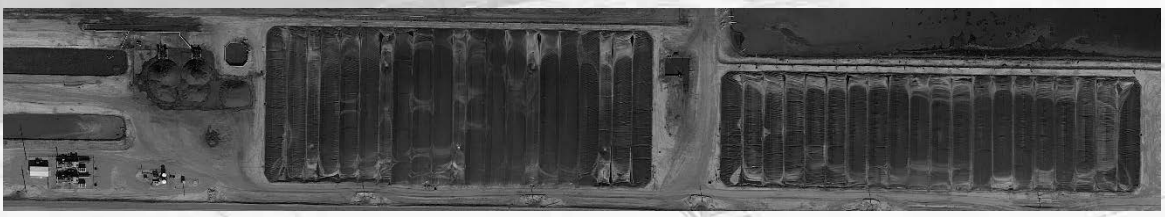
Verwey Hanford*

Pixley Biogas*

Open Sky*



Verwey Madera*



ABEC Bidart Dairy

Eriksson Pistachio

**PROJECTS WHILE AT 4CREEKS, SEE RESUME FOR FURTHER DETAIL*
Thanks for making it this far. For more information, please visit our website at:
www. Hartman.Engineering

Dairy Biogas-Related

Firm Overview

In 1968, Provost & Pritchard Consulting Group began a tradition of engineering excellence in the San Joaquin Valley. Over the course of 50 years, Provost & Pritchard has grown in size, services offered, and geography with office locations in Fresno, Clovis, Visalia, Bakersfield, Modesto, Merced, Los Banos, and Chico, California. With over 150 employees, our staff is diverse and consists of civil and agricultural engineers, hydrogeologists, environmental specialists, planners, land surveyors, construction managers and field representatives, geologists, environmental professionals, and support personnel.

Our services include:

- Agricultural and civil engineering
- Wastewater collection, treatment and disposal
- Agricultural and urban water planning
- CEQA/NEPA
- Regulatory compliance and permitting
- Land surveying
- Geographic Information Systems (GIS)
- Construction management
- Environmental engineering and permitting

Provost & Pritchard has extensive history working with dairies and agricultural entities throughout California. Our project team is experienced in providing project management services and has been successful in moving through the permitting process with the Regional Water Quality Control Board (RWQCB), and the San Joaquin Valley Air Pollution Control District (Air District). In addition, Provost & Pritchard's engineers and technicians are experienced in communicating and working with other local, state and federal agencies such as the County of San Joaquin, California Department of Water Resources (DWR), State Water Resources Control Board (SWRCB), U.S. Bureau of Reclamation (USBR), and U.S. Army Corps of Engineers (USACE) to ensure design and construction compliance with agency requirements and processes.

Wastewater Services

Provost & Pritchard Consulting Group provides engineering services for new wastewater collection, treatment, and reclamation facilities; expansion of existing facilities; and upgrading/retrofitting of existing facilities to comply with local, regional, and national objectives.

Our wastewater-related services include:

- Biogas pipeline design, permitting and construction
- Pipeline modelling and gas flow projections
- Digester, dewatering and effluent storage analysis and optimization
- Master plans
- Assistance with State of California and RWQCB regulations and permitting
- Regulatory submittals, processing and ongoing reporting
- Treatment, collection and disposal system analysis and design
- Technical reports and assessments
- Reuse/reclamation studies and design
- Operation and maintenance manuals
- Funding assistance
- Monitoring and reporting
- Construction management and review

Project Experience

Biogas Pipelines

Biogas Pipeline Project

Tulare County, California

Provost & Pritchard Consulting Group provided preliminary and final design services for over 20 miles of low pressure biogas pipeline ranging in size from 4-inch to 20-inch diameter. The pipeline connects 12 anaerobic digesters serving 13 dairies to a central gas processing facility. The project included a preliminary design report/basis of design, pressure system modeling, route and design surveys, easement descriptions, final design of the pipeline segments and appurtenances, geotechnical investigations and permitting (CEQA and County). Provost & Pritchard also provided design services during construction, reviewing submittals and responding to contractor requests for information.

Biogas Pipeline in Tulare County

Digesters

Bidart Stockdale Digester Project

California Bioenergy, LLC, Bakersfield, California

This project consisted of a 600 kW (expandable to 800 kW) peak electrical generating facility powered by biogas collected from a dairy manure anaerobic digester. Project tasks included field investigations, design, construction document preparation, permitting, and funding assistance. Provost & Pritchard was responsible for design of the effluent pump station, manure solid separator infrastructure, sand and grit separator, effluent piping, biogas piping, generator building and gas treatment area, biogas relief vent stack, digester lining system and RWQCB permitting and construction quality assurance. Construction was completed in 2010.

Bidart Stockdale Digester Project

Anaerobic Digester Project, Vintage Dairy

BioEnergy Solutions, Fresno County, California

Provost & Pritchard Consulting Group provided consulting, planning, permitting, and design services for a double-layered (60-mil HDPE primary) geosynthetic lagoon liner with leachate collection and recovery system for an anaerobic digester at Vintage Dairy located in Fresno County, California. The Vintage Dairy lagoon was designed to anaerobically digest the organic matter in the manure waste stream, generating methane gas for collection and sale. The Vintage Dairy lagoon was plumbed to overflow to the existing storage lagoons at the dairy, where the effluent is stored until crop application. The Vintage Dairy digester is approximately 35 feet deep, with a maximum cut of approximately 30 feet and an embankment approximately 5

Vintage Dairy Digester Project

feet above the surrounding grade. It was designed to provide approximately 38,140,000 gallons of anaerobic treatment volume. The embankments include one anchor trench to secure both the liner and the cover. Additionally, a leachate recovery system between the two liners was also designed.

Valley Fig Digester Project

Valley Fig Growers, Fresno, California

Valley Fig Digester Project

Provost & Pritchard Consulting Group designed an innovative anaerobic digester at the Valley Fig Growers (VFG) facility located in downtown Fresno, California. It is a showcase project that demonstrates technologically advanced anaerobic digestion as a cost-effective method for treating food processing wastewater. Anaerobic treatment of the plant's wastewater provides renewable energy and reduces the concentration of the high strength wastewater sent to the City of Fresno's sewer system, thus reducing VFG's wastewater disposal fees. The digester produces biogas, a clean-burning, renewable fuel that is captured, pressurized, and used to fire a microturbine which generates 60kW of electricity, supplying two-thirds of VFG's electrical energy needs. The biogas is also used in a boiler providing hot water to the plant. By reducing wastewater strength 70 to 80 percent with the digester, VFG is freeing up capacity for other users equivalent to 2,500 homes. This project required negotiations and persistence with the Air District to secure permits on a new emissions source. Provost & Pritchard successfully prepared grant applications for the project from the California Energy Commission and PG&E totaling nearly $600,000.

Valley Fig Digester Project

Anaerobic Digester Project

Cargill Beef Packers, Fresno, California

Provost & Pritchard Consulting Group provided permitting (including Air District permits), design, and the construction management services for the new anaerobic digester at Cargill Beef Packers facility located in Fresno, California. Committed to an energy recovery solution, Provost & Pritchard designed a system for collection and utilization of the anaerobic digester biogas to economically produce energy for the beef processing plant. This project demonstrated technologically-

Cargill Beef Packers Anaerobic Digester

advanced anaerobic digestion as a cost-effective method for treating wastewater from a beef processing facility. Anaerobic treatment reduces the concentration of the high strength wastewater sent to the City of Fresno sewer system, thus reducing both waste disposal fees to Cargill and organic loading to the City's facility. This digester also produces biogas, a clean burning renewable fuel that is captured, scrubbed, dried, and used to fire a 400 HP boiler used at the beef packing facility. The City of Fresno recognized this project's benefit in decreasing the wastewater strength, and thus postponed the need to expand the City's wastewater treatment facility.

Anaerobic Digester Project

Wawona Frozen Foods, Fresno, California

Provost & Pritchard provided the conceptual design, preliminary design, and detailed design of waste collection, pH adjustment, and anaerobic baffle reactors (ABR) for this project. The client is a major fruit processor in the Central Valley and had experienced significant waste handling problems, including extremely high charges for discharge to municipal sewers due to very high levels of biochemical oxygen demand (BOD), mostly due to dissolved sugars in the wastewater. Provost & Pritchard recommended a project to reuse 16 existing concrete tanks on site, and convert them into four series of phased anaerobic digesters, with recirculation. Due to the variability of the fruit and required cleaning processes, pH of the waste varied dramatically day to day; therefore, control systems for pH were crucial to the success of the treatment process. Since the project has been in service during fruit processing seasons, it has demonstrated reductions of more than 50 percent in BOD, with corresponding reductions in sewer fees. Seasonal shutdowns and startups have been managed with Provost & Pritchard assistance, and have been relatively smooth.

Challenges on this project included limited tankage and residence time for treatment, high influent loading, and highly variable pH. Ultimately, Provost & Pritchard designed a unique process retrofitted to existing tanks. The project design provided low capital cost, low maintenance cost, and high rate reaction. The investment was recovered within two fruit seasons.

Engine Replacement Project

Tehachapi-Cummings County Water District, Tehachapi, California

This project consisted of the selection and procurement of four 1,000-HP natural gas engines and related control systems to replace the Tehachapi-Cummings County Water District's engines at Pump Plant No. 1. The project also consisted of the selection and procurement of controls system upgrades for twelve engines at Pump Plants 2, 3, and 4. Provost & Pritchard prepared procurement packages and assisted with the bidding process for both phases. Upon contract award, the project team reviewed engine and controls system contracts, submittals, and shop drawings and worked with the District and vendors to finalize the procurement. Phase 3 of the project included procurement of engine accessories, such as heat exchanger, silencer, and the exhaust system, and design for the installation of the four engines and engine accessories at Pump Plant No. 1.

Wastewater-Related Permitting and Reporting

Tipton Milk Processing Plant Wastewater Consulting

California Dairies, Inc., Tipton, California

Wastewater Treatment Facility Upgrade: Provost & Pritchard assisted in designing and permitting a 1.3 MGD industrial wastewater treatment facility upgrade for California Dairies, Inc.'s (CDI) milk processing plant in Tipton. The plant treats high strength wastewater through a combination of equalization, waste segregation, mechanical vapor recompression (MVR) evaporation, aerated lagoons, polishing ponds and storage/percolation ponds. A groundwater monitoring network was established to monitor impacts on groundwater. The project team prepared a National Pollutant Discharge Elimination System (NPDES) permit renewal

CDI's Wastewater Treatment Facility at the Tipton Milk Processing Plant

application and prepared numerous technical studies required by the permit, and also assisted the owner in regulatory compliance issues. Provost & Pritchard was successful in demonstrating to the RWQCB the viability of using a single liner for pond construction. A Construction Quality Assurance (CQA) plan was developed and implemented by Provost & Pritchard staff.

Tipton Plant – Pond 2 Liner: Provost & Pritchard assisted CDI in obtaining RWQCB approval to construct a single 60 mil HDPE liner for their industrial wastewater treatment pond expansion project. An existing unlined storage pond was converted to three treatment ponds to expand their treatment capacity and provided for nitrification and enhance treatment reliability. Provost & Pritchard modeled impacts resulting from leakage from assumed manufacturer defects in a single liner, demonstrating that there would be less than significant impact on groundwater. A pond liner evaluation study was prepared and submitted to the RWQCB for review. Provost & Pritchard developed a CQA plan and obtained approval from the RWQCB to proceed with a single liner design. The single liner resulted in significant cost savings to CDI. Provost & Pritchard provided full time CQA observation and a final CQA report during and following the liner installation. The project was completed in 2009.

Tipton Plant - NPDES/WDR Permit Technical Reports: Provost & Pritchard has assisted CDI in the preparation of various technical reports and work plans required by their NPDES/ Waste Discharge Requirements (WDR) permit issued in July 2008. The technical reports are for the discharge of 1.3 MGD treated industrial effluent to the Lower Tule River Irrigation District's Casa Blanca Canal. The technical reports/work plans consist of: Waste Management & Disposal Management Plan Technical Report; Effluent Salinity Reduction Work Plan Technical Report; Work Plan for Final Groundwater Limitations Study; Toxicity Reduction Evaluation Work Plan; Wastewater Management Practices Technical Report; Work Plan Pollution Prevention Plan for Zinc and Treatment Feasibility Study; and Work Plan for Ammonia Compliance. In addition, Provost & Pritchard has prepared the operations and maintenance manual for the industrial waste treatment system. The project team continues to provide consulting services to CDI regarding their wastewater treatment system and NPDES permit. The work Provost & Pritchard has completed has helped CDI transition to 100 percent compliance with waste discharge requirements.

Phase I Environmental Site Assessment

River Partners, Stanislaus County, California

Provost & Pritchard was responsible for the preparation of a Phase I environmental site assessment (ESA) for a dairy site and farmland in Stanislaus County. The dairy operation was 465 acres and milked 1,400 cows. The project team collected pertinent data from the County, and was responsible for marking utilities on the property prior to drilling for water sampling, and prepared the final ESA report.

Wastewater Permitting & Engineering Services for New Cheese Plant

Mozzarella Fresca, Inc., Tipton, California

Provost & Pritchard provided the necessary wastewater permitting and engineering services needed to renovate and start up an old cheese plant for Mozzarella Fresca. Wastewater discharge permit, county permit, dissolved air flotation (DAF) unit treatment system, pipelines, above ground tank, irrigation system reconfiguration, and other necessary services were provided. Mozzarella Fresca has since become one of the largest fresh mozzarella cheese makers in the United States.

Environmental Impact Report

Blanco Dairy, Tulare County, California

Provost & Pritchard prepared an environmental impact report (EIR) for the construction and operation of Blanco Dairy to disclose, evaluate, and provide mitigation measures for potentially significant environmental effects associated with the construction and operation of the dairy. Preparation of an EIR is a requirement for compliance with California Environmental Quality Act (CEQA) for all discretionary projects in California that have a potential to result in significant environmental impacts. The project included analysing environmental impacts resulting from a 103-acre dairy facility which has the potential to house 2,300 milk cows and 1,646 head of support stock, such as the analysis of greenhouse gas emissions and project-generated traffic impacts.

In addition, Provost & Pritchard has also completed environmental impact reports for other dairies throughout Central California, including: White River Dairy in Corcoran, Bosman Dairy in Tipton and Lerda Farms Dairy in Tulare.

Waste Management Plans

Various Dairies, California

Provost & Pritchard prepared a Waste Management Plan for submittal to the RWQCB for several dairies in California in order to comply with the Monitoring and Reporting Program #2007-0035 (General Order of Waste Discharge Requirements for Existing Milk Cow Dairies). The various dairies include:

- Dennis Boertje & Sons, Visalia, California
- Red Rose Dairy, Visalia, California
- Van Beek Brothers, Tipton, California
- Jorge Dairy, Corcoran, California
- Medeiros & Sons, Hanford, California
- Riverbend Dairy, Tulare, California
- DeGroot Dairies North, Hanford, California
- Johann Dairy, Fresno, California
- Diamond H Dairy, Chowchilla, California
- Aukeman Farms, Tulare, California
- Friesian Farms Dairy, Tulare California

The waste management plans included:

1. Facility description, which included the location of the facility, owner and operator information, herd breakdown, and volume of process water generated;
2. Engineering Report for Adequate Containment Capacity, which was based on length of time needed to store, barn water generation, rainfall, and reserve volume for a 25-year 24-hour storm, minus evaporation from the lagoon;
3. Engineering Report for Adequate Flood Protection;
4. Report of Confinement Areas, which evaluated animal housing and manure and feed storage areas to verify that all wastewater could be diverted to the lagoon;
5. Operations and Maintenance Plan that outlined standard procedures to ensure proper discharge of waste and to minimize infiltration of wastewater into underlying soils; and
6. Backflow Verification that verified there were no cross-connections that would allow the backflow of wastewater into supply wells or surface waters.

Provost & Pritchard has extensive experience working with dairies and other agricultural entities to meet the regulatory requirements of the RWQCB and other agencies.

Project Team Resumes

Kenneth Shuey, PE

Project Manager/Client Contact

Education

- ✓ B.S. Civil Engineering, Colorado State University, Fort Collins

Licenses/Registrations/Certifications

- ✓ Civil Engineer #33558
- ✓ Professional Engineer, Colorado #20078
- ✓ Professional Engineer, Georgia #19511
- ✓ Professional Engineer, New Mexico #12836
- ✓ Professional Engineer, Tennessee #22407

Affiliations

- ✓ California Water Environment Association (CWEA)
- ✓ Water Environment Federation (WEF)
- ✓ American Society of Civil Engineers (ASCE)

Areas of Expertise

- ✓ Project Management
- ✓ Wastewater Treatment, Lift Stations & Collection
- ✓ Water Supply, Pump Stations & Distribution
- ✓ Grant & Loan Funding
- ✓ Rate Studies & Proposition 218
- ✓ Construction Management
- ✓ Utility Management

Professional Summary

Ken Shuey is a principal engineer at Provost & Pritchard with over 35 years of experience. His areas of expertise include permitting, funding, planning, design, and construction support of wastewater and water treatment and conveyance systems. He has served as regional manager, office manager, project manager, and project engineer on a wide range of water and wastewater related projects. In addition, he specializes in utility rate studies and assisting clients with California's Proposition 218 utility rate approval process.

Relevant Experience

Lake Wildwood Wastewater Treatment Facility Aerobic Digester & UV Disinfection, Nevada County Sanitation District No. 1, Nevada County, California, Project Manager – This project consisted of the preliminary design report identifying improvements to the Lake Wildwood Wastewater Treatment Plant. Improvements included UV disinfection, a new aerobic digester, new laboratory, upgraded headworks, and improvements to the existing emergency storage basin. The project also included process and hydraulic modeling of the plant to determine existing capacity and improvements required to treat additional flows from the district's Penn Valley plant. This preliminary design report included a proposed service area expansion and capacity for future growth along with a condition assessment of existing facilities. Mr. Shuey also managed a team of consultants for final design including the design and construction management of UV disinfection, upgrades to the pressure filters to improve performance and effluent quality, return activated sludge (RAS) pump upgrades, chemical feed system improvements and other process improvements. Effluent quality improvements from the filter upgrades allowed a more economical UV disinfection design reducing both capital and operations costs.

New Wastewater Treatment Plant City Advisor, City of Ridgecrest, California, Project Manager – Mr. Shuey is a co-project manager for the design and construction of a new wastewater treatment plant in the City of Ridgecrest. Recently completed were the SRF Project Report for a SRF loan application including the financial and rate analysis, 30% design of the proposed improvements and the CEQA environmental document.. Additional project tasks include performing overall project management, a facility plan update, site selection, documenting existing conditions,

Kenneth Shuey, PE *(continued)*

Project Manager/Client Contact

developing performance and construction quality criteria, and developing 30 percent preliminary design. The 30-percent wastewater treatment plant design has been completed and submitted to the City. The proposed wastewater treatment plant will utilize oxidation ditch technology to nitrify/de-nitrify the wastewater and provide the option for future tertiary treatment for recycled water applications.

Main Sewer Lift Station Replacement, Riverdale Public Utility District, Fresno County, California, QA/QC – This project consists of replacing Riverdale Public Utility District's main sewer lift station and constructing a new submersible pump station immediately north of the existing lift station. Mr. Shuey provided quality assurance/quality control oversight of the design for the new lift station. The lift station improvements include site grading, security fencing, aggregate base rock surfacing, submersible lift station, onsite piping, electrical service and motor control center, water service to the site, and demolition of the existing sewer lift station.

Penn Valley Wastewater Collection and Treatment System, and Facility Planning, Nevada County Sanitation District No. 1, Nevada County, California, Project Manager – This project consisted of facilities planning and preliminary design for improvements to the existing lagoon and land application treatment system. The current system uses lagoon treatment and onsite reservoir storage to supply recycled water for irrigation of pasture land (restricted reuse). Treatment reliability is compromised by insufficient reservoir storage. Two alternatives were proposed to address capacity issues: 1) addition of subsurface drip disposal to allow year-round application of effluent; and 2) pumping wastewater flows to another Nevada County wastewater treatment system. Mr. Shuey developed population and flows projections, water balances for sewer storage and irrigation, and a facilities assessment. Mr. Shuey assisted the District in funding options and negotiations with the Regional Water Quality Control Board regarding the second option. He is led the preliminary and final design of improvements to convey Penn Valley wastewater to a neighboring wastewater treatment plant and decommissioning of the existing Penn Valley Wastewater Treatment Plant, and is assisting with design reviews of construction activities.

Lake of the Pines Wastewater Treatment Facility Planning and Upgrade, Nevada County Sanitation District No. 1, Nevada County, California, Project Manager – Mr. Shuey served as the project manager for the upgrade of a 3.6 MGD wastewater treatment plant, converting the existing pond treatment system to an advanced tertiary treatment facility. The project included headworks with screening and grit removal, membrane bio-reactor (MBR) treatment, UV disinfection, aerobic digester with membrane thickener, centrifuge solids dewatering, influent lift station, administration building, and septage receiving station. Mr. Shuey managed a team of consultants responsible for facilities planning, preliminary and final design, bidding, and construction management. He also conducted a sewer system evaluation study, population projections and service area expansion, along with funding support, Proposition 218 compliance assistance. In addition, he helped the client in obtaining a combination of State Revolving Fund (SRF) loan and bank funding. The total construction cost was $17 million including less than 4 percent of change orders during construction. The project won a state ACEC merit award in 2010.

McCourtney Road Landfill Leachate Disposal System, Nevada County Sanitation District No. 1, Nevada County, California, Project Manager – Mr. Shuey prepared preliminary and final design of a new leachate storage and disposal system for the County of Nevada's closed McCourtney Road Landfill. Current facilities store leachate in an open storage reservoir, where it is hauled offsite for disposal. Winter rainfall doubles the amount of leachage that must be hauled offsite. Preliminary design alternatives for the project included reverse osmosis treatment, solar and mechanical evaporation, and upgraded storage alternatives. The selected alternative included a 1.0 MGD covered storage tank, odor control and truck loading facilities. Upgraded leachate pump stations were also included in the project.

Steve Bommelje

Environmental Specialist

Education

- ✓ B.S. Mechanical Engineering, California State University, Fresno

Areas of Expertise

- ✓ Authority to Construct Air Permits
- ✓ Dairy Permitting Requirements
- ✓ Dairy General Order Compliance
- ✓ PM10 Evaluation using AERMOD
- ✓ Waste Management Plans
- ✓ Increased Efficiency of Barn Water Generation

Professional Summary

Steve Bommelje is an environmental specialist at Provost & Pritchard where he specializes in all aspects of dairy permitting and regulatory compliance. He will be responsible for the digester project's permitting process related to the Regional Water Quality Control Board. Mr. Bommelje's experience includes the design of dairy sites that meet the requirements of both air and water permitting, performing AERMOD evaluations of PM10-generation, submittal of Authority of Construct documents, and the preparation of waste management plans, lagoon liner designs and liner installation CQA.

Relevant Experience

Data Management System, Various Facilities, San Joaquin Valley, California, Project Manager – Mr. Bommelje was responsible for the creation of a data management system a number of Provost & Pritchard's dairy clients utilize for annual reporting to the RWQCB in order to meet the requirements of the Dairy General Order. The system prepares reports that contain exactly what is required by the RWQCB, without providing charts and graphs of information that were intended for on-farm use only. Through this database management system, Provost & Pritchard has reduced compliance costs and stress for the firm's dairy clients by identifying cost-effective process improvements during routine regulatory compliance.

Waste Management Plans, Various Facilities, San Joaquin Valley, California, Project Manager – Mr. Bommelje has been responsible for the development of waste management plans for numerous agricultural facilities throughout the San Joaquin Valley. Project tasks included development of analysis tools for barn water generation and manure generation. This is then balanced with a nitrogen management plan of the application fields to define the actual storage capacity needed for the dairy lagoons.

Lagoon Liner Design, Various Facilities, San Joaquin Valley, California, Project Manager – Mr. Bommelje has been responsible for the development of lagoon designs and Construction Quality Assurance (CQA) oversight using high-density polyethylene (HDPE) liner materials, both single and double liner designs, for numerous agricultural facilities throughout the San Joaquin Valley.

Irrigated Lands Regulatory Program, Kaweah Basin Water Quality Association, Tulare County, California, ILRP Consultant – Provost & Pritchard currently manages the KBWQA under the governance of the grower elected and appointed board. Mr. Bommelje provides consulting services for members of the KBWQA regarding compliance with the RWQCB's ILRP General Order. He regularly meets with KBWQA member growers to provide guidance in the completion of required reports including Farm Evaluation

Steve Bommelje *(continued)*

Environmental Specialist

Surveys, Nitrogen Management Plan worksheets, and other compliance requirements. He has built strong relationships with the State Water Resources Control Board, RWQCB, Coalition leads, commodity groups, and growers throughout the Central Valley.

AERMOD PM10 Evaluations, Various Facilities, San Joaquin Valley, California, Project Manager – Mr. Bommelje developed protocols for the assessment of dairy sites using the AERMOD software.

Dairy Owner/Operator, Central Valley, California – Mr. Bommelje has 10 years of experience owning and operating a dairy in the Central Valley.

85 Pascon Court
Gaston, SC 29053
(803) 551-5700
(803) 551-5701 FAX
www.efiusa.com

Statement of Qualifications

Company Background

For over two decades, Environmental Fabrics, Inc. (EFI) has been fabricating, supplying, and installing solutions to reduce environmental impact, improve operational efficiency, and increase profitability for customers.

EFI's capabilities and expertise include geosynthetic liner and cover systems, primary and secondary tank and impoundment lining, soil stabilization and erosion control solutions, custom 'in house' fabrication, geosynthetic repairs and rehabilitation, material and equipment supply, and consulting and advisement.

Priority: Health, Safety, Environment

HSE personnel are trained by the American Red Cross, regional safety councils, and other applicable entities. As of February 2017, EFI boasts a 0.77 EMR, and has been accident/incident free for 42 months.

EFI is a member of the Columbia Green Business Program and supporter of the Environmental Education Association of South Carolina.

Competency, Capability and Focus on Quality

EFI uses field proven equipment while adhering to the highest levels of quality control standards. EFI is a proud member of the International Association of Geosynthetic Installers. Our work is performed based on the IAGI Installation Specification as well as material manufacturer and project installation specifications.

EFI maintains crews of qualified supervisory, quality control and safety, technical and labor personnel. Supervisors are trained through field experience and EFI's supervisor training system. Quality Control personnel are trained by IAGI, the Geosynthetic Research Institute (GRI), material manufacturers and other applicable authorities. Technicians are certified by IAGI and applicable manufacturer programs.

Key Personnel

Dennis Shanklin
dennis@efiusa.com

Dennis co-founded Environmental Fabrics, Inc in 1993 with a focus on environmental solutions and quality innovation. He has earned 3 cover patents as an inventor, co-founded a post-industrial waste recycling company, and worked with engineers, farms, municipalities and government agencies, including the USAID's Global Methane Initiative, to promote Anaerobic Digestion Lagoon Systems in the U.S. and around the world.

Dennis Shanklin is a Navy Veteran, founding member of the International Association of Geosynthetic Installers, a proud founding supporter of the EPA/USDA AgSTAR program, and a member of the South Carolina Chamber of Commerce.

CA Dairy Digester Projects

Project:	Castelanelli Brothers Dairy Lodi, CA	**Completed:**	January 2004
Application:	Anaerobic Digester Liner & Cover System	**Material:**	HDPE

Project:	Cotton Wood Dairy Atwater, CA	**Completed:**	March 2004
Application:	Anaerobic Digester Cover System	**Material:**	60mil HDPE

Project:	Sierra Cattle Company Lindsay, CA	**Completed:**	September 2004
Application:	Anaerobic Digester Cover System	**Material:**	60mil HDPE

Project:	St. Anthony Farm Petaluma, CA	**Completed:**	April 2007
Application:	Anaerobic Digester Cover System	**Material:**	60mil HDPE

Project:	Robert Giacomini Dairy Point Reyes Station, CA	**Completed:**	March 2008
Application:	Anaerobic Digester Cover System	**Material:**	60mil HDPE

Project:	Hillarides Dairy Lindsay, CA	**Completed:**	June 2008
Application:	Anaerobic Digester Cover System	**Material:**	60mil HDPE

Project:	Bidart Stockdale Bakersfield, CA	**Completed:**	July 2010
Application:	Anaerobic Digester Tier 1 Liner & Cover System	**Material:**	HDPE

Project:	VanWarmerdam Dairy Galt, CA	**Completed:**	July 2013
Application:	Anaerobic Digester Cover System	**Material:**	80mil HDPE

Project:	Old River Dairy Bakersfield, CA	**Completed:**	November 2013
Application:	2x Anaerobic Digester Tier 1 Liner & Cover System	**Material:**	HDPE

Project:	Pacific Rim Dairy Corcoran, CA	**Completed:**	February 2014
Application:	3x- Anaerobic Digester Cover Systems	**Material:**	60mil HDPE

Project:	Van Steyn Dairy Elk Grove, CA	**Completed:**	July 2015
Application:	Anaerobic Digester Cover System	**Material:**	80mil HDPE

Project:	Open Sky Ranch Riverdale, CA	**Completed:**	July 2015
Application:	Anaerobic Digester Cover System Rehab	**Material:**	

Project:	Verwey Hanford Dairy Hanford, CA	**Completed:**	July 2016
Application:	Anaerobic Digester Cover System	**Material:**	80mil HDPE

Project:	G.J. teVelde Ranch Tipton, CA	**Completed:**	September 2016
Application:	3x- Anaerobic Digester Cover Systems	**Material:**	60mil HDPE

Project:	Verwey Madera Dairy Madera, CA	**Completed:**	March 2017
Application:	Anaerobic Digester Cover System	**Material:**	80mil HDPE

Ca Lic# 907032
3711 Meadowview Dr.
Suite 100
Redding, CA 96002

o. 530-222-3366
c. 760-717-1605

Qualifications

Electric Innovations Inc. has become the most experienced general and electrical contractor servicing Dairy Digesters and Utility Interconnection in the State of California, with a total of over $92.4M in projects successfully completed or currently under construction. EI Inc. has been instrumental in the successful development, construction and startup of 8 successful renewable energy projects over the past 7 years, as well as currently under construction on 4 expansion projects and a 10 dairy Digester pipeline project. Principal Theodore Thompson is a graduate from Thomas Edison State College with a BSBA in computer science. He is founder and CEO of Electric Innovations specializing in general contracting, project management, high voltage work, utility interconnection, and electrical engineering.

Education, Licenses and Certifications

Medium Voltage Splicing **Jul 2014**

AVO Certified Medium voltage 1kv-35kv splicing, terminating, and grounding systems

C – 10 Electrical **Nov 2007**

C-10 Electrical contractor classification with the California State License Board. Lic. #907032

B – General Contractor **Nov 2007**

Licensed general contractor with the California State License Board. Lic. #907032

Project Manager for Sumac Development Inc. **April 2004 – Nov 2007**

Project manager for commercial and residential construction, supervisor for electrical crew

BSBA – Computer Science **2001-2004**

Graduate from Thomas Edison State College in business administration, with emphasis in computer science.

Recent Projects

Calgren Dairy Fuels 10 Digester Cluster, Pixley CA **May 2017 – Current**

Design and engineering, pipework design, electrical controls and automation, new electric service, project management assistance for 30-mile pipeline project and 10 digesters. Project approximate Value $49M

Verwey Farms#2 Digester 2MW Expansion Project, Tipton CA **Nov. 2017 – Current**

Design and engineering, pipework design and installation, project management, welding supervisor for biogas line. Electrical automation and controls installation. Utility interconnection, relay protection and all other electrical aspects of project. 1MW Genset. Project approximate Value $2.5M

Verwey Farms Digester 800 KW Expansion Project, Madera CA Nov. 2017 – Current

Design and engineering, pipework design and installation, project management, welding supervisor for biogas line. Electrical automation and controls installation. Utility interconnection, including reclosers, primary service metering, ground fault banks, relay protection and all other electrical aspects of project. 800kw Genset. Project approximate Value $1.5M

Open Sky Digester 800 KW Expansion Project, Riverdale CA Dec. 2017 – Current

Design and engineering, pipework design and installation, project management, welding supervisor for biogas line. Electrical automation and controls installation. Utility interconnection, including reclosers, primary service metering, ground fault banks, relay protection and all other electrical aspects of project. 800kw Genset. Project approximate Value $1.45M

Van Beek Dairy Digester 800 KW Project, Tipton CA Nov. 2017 – Current

Design and engineering, pipework design and installation, project management, welding supervisor for biogas line. Electrical automation and controls installation. Utility interconnection, including reclosers, primary service metering, ground fault banks, relay protection and all other electrical aspects of project. 2500 ft of 12.4kv underground line. 800kw Genset. Project approximate Value $3.5M

TeVelde Dairy Biogas Digester, Tipton CA April. 2016 – June 2017

Design and engineering, pipework design, welding supervisor for flare and biogas line. Electrical and ignition controls installation. Utility interconnection, relay protection and all other electrical aspects of project. 800kw Genset. Project approximate Value $1.9M

Verwey Madera Dairy Biogas Digester, Madera CA Jan. 2016 – April 2017

Design and engineering, pipework design, welding supervisor for flare and biogas line. Electrical and ignition controls installation. Utility interconnection, relay protection and all other electrical aspects of project. 600kw genset with 800kw additional in the future. Project approximate Value $5.5M

Verwey Hanford Dairy Biogas Digester, Hanford CA Oct. 2015 – January 2017

Design and engineering, pipework design, welding supervisor for flare and biogas line. Electrical and ignition controls installation. Utility interconnection, relay protection and all other electrical aspects of project. 1MW genset with 2 MW additional in the future. Project approximate Value $8M

Open Sky Ranch Biogas Digester, Riverdale CA July 2015 – October 2016

General contractor, pipework design, welding supervisor for flare and biogas line. Electrical and ignition controls installation. Utility interconnection, relay protection and all other electrical aspects of project. Project approximate Value $4M

Van Steyn Dairy Biogas Digester, Elk Grove CA Nov 2014 – Sept 2015

Project field supervisor and general contractor, electrician, utility interconnection etc. Project Value $1.4M

Pacific Rim Additional Interconnection, Corcoran CA Nov 2014 – June 2015

Project field supervisor, electrician, utility interconnection and design. Remove two PGE service locations and connect all Dairy loads to digester distribution. Project approximate Value $200,000

Pacific Rim Dairy Biogas Digester, Corcoran, CA April 2014 – October 2014

Project field supervisor, electrical contractor including 12kv overhead power lines, transformer, utility interconnection, relay protection, and all other electrical aspects of the project. Project Approximate Value $2.5M

Calgren Renewable Fuels Biogas Digester, Pixley CA April 2012 – October 2014

Electrical contractor for Calgren Renewable Fuels Digester, including design and build work, permitting, 5kv switchgear and linework to 4J dairy. Project approximate value $9. 3M

Van Warmerdam Dairy Biogas Digester, Galt CA Nov 2011 – June 2012

General contractor, project field supervisor, electrician, utility interconnection. Project approximate Value $1.7M

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

December 14, 2017

Advice Letter 5217-G

Ronald van der Leeden
Director, Regulatory Affairs
Southern California Gas
555 W. Fifth Street, GT14D6
Los Angeles, CA 90013-1011

SUBJECT: Rule No. 39, Access to the SoCalGas Pipeline System, Interconnection Agreements Form Deviation

Dear Mr. van der Leeden:

Advice Letter 5217-G is effective as of December 13, 2017.

Sincerely,

Edward Randolph

Edward Randolph
Director, Energy Division

Ronald van der Leeden
Director
Regulatory Affairs

555 W. Fifth Street, GT14D6
Los Angeles, CA 90013-1011
Tel: 213.244.2009
Fax: 213.244.4957
RvanderLeeden@semprautilities.com

November 13, 2017

Advice No. 5217
(U 904 G)

Public Utilities Commission of the State of California

Subject: Rule No. 39, Access to the SoCalGas Pipeline System, Interconnection Agreements Form Deviation

Purpose

Southern California Gas Company (SoCalGas) hereby submits for approval by the California Public Utilities Commission (Commission or CPUC) a request to deviate from Rule No. 39, Access to the SoCalGas Pipeline System, requirements to permit Calgren Dairy Fuels, LLC ("Calgren") to use the California Producer Interconnection Agreement (CPIA), California Producer Operational Balancing Agreement (CPOBA), California Producer Interconnect Collectible System Upgrade Agreement (CPICUSA), and the California Producer Agreement to Transfer Ownership (CPATO) (the CPIA, CPOBA, CPICUSA, and CPATO are collectively referred to herein as "CP Forms") instead of the Interconnection Agreement (IA), Operational Balancing Agreement (OBA), and Interconnect Collectible System Upgrade Agreement (ICSUA) (the IA, OBA and ICSUA are referred to herein as "Base Forms") and revise its List of Contracts and Deviations, as shown on Attachment A. Calgren is expected to be SoCalGas' first dairy based biomethane interconnection.

Background

SoCalGas Rule No. 39 specifies that SoCalGas and the interconnector must execute the Base Forms unless the interconnector is a California Producer. If the interconnector is a California Producer, then SoCalGas and the interconnector must execute the CP Forms.

The Base Forms were established pursuant to Decision (D.) 06-09-039 in the Gas Market Order Instituting Rulemaking (R.) 04-01-025. The CP Forms were established in D.07-08-029 as a result of Application (A.) 04-08-018, SoCalGas Application to

Establish Regulatory Authority Over the Access for Natural Gas Provided by California Gas Producers. In implementing D.07-08-029, SoCalGas established a definition for a California Producer based on the gas deliveries associated with natural gas from oil and/or gas wells, which is contained in SoCalGas Tariff Rule No. 1.[1] Biomethane interconnections were not contemplated as part of D.06-09-039 or D.07-08-029.

Since the issuance of D.06-09-039 and D.07-08-029, the State of California has and continues to provide policy support for developing the renewable gas market, and has directed the Commission and other state agencies to implement policies that promote renewable gas market development. For example, Assembly Bill (AB) 1900 (Gatto, 2012) and the resulting Section 399.24 of the Public Utilities Code require the Commission to adopt policies and programs that promote the in-state production and distribution of biomethane. AB 2313 (Williams, 2016) and the resulting Section 784.2 of the Public Utilities Code require the Commission to consider options to further the goals of Section 399.24, including enabling utility ratebased investment in infrastructure to interconnect biomethane facilities with the natural gas pipeline. Additionally, Senate Bill (SB) 1383 (Lara, 2016) provides for broad policy support to enable the reduction of short lived climate pollutant (SLCP) emissions, including dairy-sourced methane emissions, and specifically identifies the need to demonstrate the viability of pipeline-injected renewable gas as a strategy to meet its SLCP emission reduction goals.

Calgren has stated that its dairy based biogas production is similar to California Producer production and that the CP Forms are more appropriate for their biogas. As a result, Calgren has requested it be allowed to use the CP Forms.[2]

Proposed Revisions

SoCalGas requests Commission approval to allow SoCalGas and Calgren to enter into the CP Forms in lieu of the Base Forms. Calgren will be included in SoCalGas' tariff, List of Contracts and Deviations, as shown on Attachment A.

This filing will not increase any rate or charge or cause the withdrawal of service.

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[1] SoCalGas Rule No. 1 defines a California Producer as "An entity which produces natural gas in association with crude oil (associated natural gas) or non-associated natural gas from oil and/or gas wells and is interconnected with the Utility's pipeline system."

[2] Both D.06-09-039 and D.07-08-029 envisioned deviations from the form agreements via an advice letter. *See* D.06-09-039 at 88 ("These standardized agreements should be considered the standard template, with deviations obtained through the advice letter process."). *See also* D.07-08-029 at 81 (Conclusion of Law 4: "SoCalGas and the producers should have the flexibility to negotiate mutually acceptable deviations to the IA and OBA, as adopted in this decision, through the filing on an advice letter."), and 83 (Ordering Paragraph 3.a: "SoCalGas and the California producers may negotiate mutually acceptable deviations to the adopted Interconnection Agreement and Operational Balancing Agreement through the filing on an advice letter.").

Protest

Anyone may protest this Advice Letter to the Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. The protest must be made in writing and received within 20 days of the date of this Advice Letter, which is December 3, 2017. There is no restriction on who may file a protest. The address for mailing or delivering a protest to the Commission is:

CPUC - Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102

Copies of the protest should also be sent via e-mail to the attention of the Energy Division Tariff Unit (EDTariffUnit@cpuc.ca.gov). A copy of the protest should also be sent via both e-mail and facsimile to the address shown below on the same date it is mailed or delivered to the Commission.

Attn: Ray B. Ortiz
Tariff Manager - GT14D6
555 West Fifth Street
Los Angeles, CA 90013-1011
Facsimile No.: (213) 244-4957
E-Mail: ROrtiz@semprautilities.com

Effective Date

SoCalGas believes this Advice Letter is subject to Energy Division disposition and should be classified as a Tier 2 (effective after staff approval) pursuant to General Order (GO) 96-B and direction from the Commission's Legal Division. SoCalGas respectfully requests that this Advice Letter be approved on December 13, 2017, which is 30 calendar days after the date filed.

Notice

A copy of this Advice Letter is being sent to SoCalGas' GO 96-B service list and the Commission's service list R.04-01-025, Gas Market Rulemaking. Address change requests to the GO 96-B should be directed by electronic mail to tariffs@socalgas.com or call 213-244-2837. For changes to all other service lists, please contact the Commission's Process Office at 415-703-2021 or by electronic mail at Process_Office@cpuc.ca.gov.

_____

Ronald van der Leeden
Director - Regulatory Affairs

Attachments

WELLS FARGO

Kings-Tulare Commercial Banking Office
MAC A0846-011
3300 S. Demaree Street
Visalia, CA 93277

Tel: 559 622 3000
Fax: 559 738 1403

February 16, 2018

California Department of Food and Agriculture (CDFA)
Dairy Digester Research and Development Program
1220 N Street, Suite 400
Sacramento, CA 95814

Re: Bernard Te Velde dba Lone Oak Farms

To Whom It May Concern:

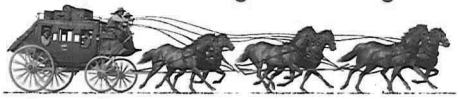
Bernard Te Velde dba Lone Oak Farms has been a valued customer of Wells Fargo Bank since 2001 and maintains a satisfactory borrowing relationship. Lone Oak Farms maintains a borrowing relationship with commitments totaling Thirty Five Million dollars ("$35,000,000.00") which are available to support ongoing business operations including methane digester projects. In addition, Lone Oak Farms maintains their treasury management services with Wells Fargo Bank.

Please feel free to contact me should you have any questions or required any additional information. You can reach me by phone at 559-622-3015 or email at Brett.M.Lew@wellsfargo.com.

Regards,

Brett Lew
Vice President
Relationship Manager

Together we'll go far



GENERATECAPITAL

Honorable Karen Ross
Secretary of California Dept of Food and Agriculture
1220 N Street
Sacramento, CA 96814

February 14, 2018

Re: Generate Capital, Inc. Financial Statements supporting Maas Energy Works DDRDP Applications

Dear Secretary Ross,

Generate Capital, Inc. ("Generate") is pleased to present to the California Department of Food and Agriculture information about our company that shows Generate has the ability to fund the capital needs for Common Hub equipment and digesters for all of Maas Energy Works 2018 DDRDP applications.

Attached to this letter as Exhibit A you will find a proof of funds letter from Wells Fargo showing a cash balance in excess of $22 million in an account owned by Generate. In addition to the proof of funds, Generate has significant funds immediately available for investment upon further capital calls from a $200 million fundraising that was closed in September 2017. The press release from this fundraising is included herein as Exhibit B.

It is our policy that we do not provide financial statements in circumstance where they could become public information. However, we are happy to allow up to two of your representatives to review our financial information in physical form in person at our office.

Sincerely,

Jigar Shah

Jigar Shah
President & Co-Founder
Generate Capital, Inc.

Exhibit A: Proof of Funds Letter from Wells Fargo

Global CleanTech Group
45 Fremont Street, 7th Floor
San Francisco, CA 94105

Fax: 866-512-9719

February 6, 2018

To Whom It May Concern:

This is to confirm that our client, Generate Capital Inc., has been with Wells Fargo Bank since 2014 and current balance in account is approximately $22MM.

Feel free to contact me with any questions.

Mina Tran
VP, Relationship Manager, CleanTech Group
Wells Fargo Corporate Banking | 45 Fremont Street, 7th Floor | San Francisco, CA 94105
Phone 415-396-5202
Fax 866-512-9719

mina.t.tran@wellsfargo.com

Exhibit B: Generate Capital Fundraising Press Release

https://www.bloomberg.com/news/articles/2017-10-24/generate-capital-raises-200-million-to-back-clean-energy

October 24, 2017

Generate Capital Inc., a clean-energy financing company, raised about $200 million in new equity to back battery-storage and other distributed-energy projects.

Alaska Permanent Fund Corp., a state-owned entity based in Juneau, led the round, San Francisco-based Generate said in a statement Tuesday.

Generate, which was formed in late 2014, invests in renewable-energy, energy-efficiency, waste, agriculture and water projects. It has supported on-site battery systems from Stem Inc., funded fuel-cell forklifts made by Plug Power Inc. and backed a water-treatment system used by Lagunitas Brewing Co. It recently collaborated with Sharp Electronics Corp. on microgrid projects in California with solar and storage.

"What we do say to these partners: we can be your partner forever -- genuinely -- because we don't have to sell our projects or our positions," Scott Jacobs, Generate's chief executive officer, said in an interview. "We can be permanent capital."

Generate focuses on projects often ignored by other financing companies: small projects that cost as little as $500,000. It structures deals like long-term equity facilities that let sponsors use the funding for multiple projects.

"It's inefficient to raise $500,000 for each project," Jacobs said. He co-founded Generate with Jigar Shah, who earlier founded SunEdison Inc., and investor Matan Friedman.

Generate, which also offers debt, has leveraged its own equity to support more than $500 million in projects, Jacobs said.

"Oftentimes, policymakers will mandate climate solutions to implement, but then they don't actually ensure that a project-finance partner is ready to support the roll-out," Shah said. "We naturally fill that role."

WELLS FARGO

Kings-Tulare Commercial Banking Office
MAC A0846-011
3300 S. Demaree Street
Visalia, CA 93277

Tel: 559 622 3000
Fax: 559 738 1403

February 8, 2018

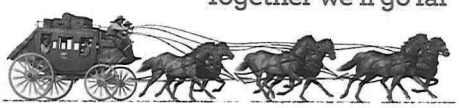
To Whom It May Concern:

Eric Westra and Decade Dairy have been customers of Wells Fargo Bank since 2001 and currently maintain a satisfactory borrowing relationship. Eric Westra and Decade Dairy have sufficient borrowing capacity for the $3,250,000 required for the Decade Dairy Digester project being developed and built by Decade Energy, LLC.

Sincerely,

Jill Van Hofwegen
Relationship Manager
Wells Fargo Bank
559-622-3049

Together we'll go far



Kings-Tulare Commercial Banking Office
MAC A0846-011
3300 S. Demaree Street
Visalia, CA 93277

Tel: 559 622 3000
Fax: 559 738 1403

June 21, 2018

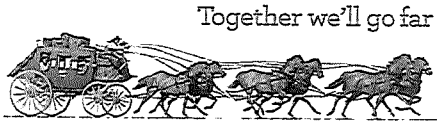
To Whom It May Concern:

Eric Westra and Decade Dairy have been customers of Wells Fargo Bank since 2001 and currently maintain a satisfactory borrowing relationship. Eric Westra and Decade Dairy have sufficient borrowing capacity for the $2,350,000.00 required for the Clear Lake Digester project being developed and built by Decade Energy, LLC.

Sincerely,

Jill Van Hofwegen
Relationship Manager
Wells Fargo Bank
559-622-3000

Together we'll go far



WELLS FARGO

Kings-Tulare Commercial Banking Office
MAC A0846-011
3300 S. Demaree Street
Visalia, CA 93277

Tel: 559 622 3000
Fax: 559 738 1403

February 16, 2018

California Department of Food and Agriculture (CDFA)
Dairy Digester Research and Development Program
1220 N Street, Suite 400
Sacramento, CA 95814

Re: Dixie Creek Ranch

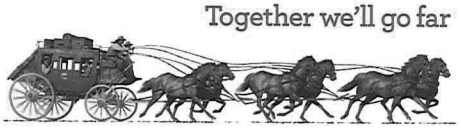
To Whom It May Concern:

Dixie Creek Ranch has been a valued customer of Wells Fargo Bank since 2001 and maintains a satisfactory borrowing relationship. Dixie Creek Ranch maintains a borrowing relationship with commitments totaling Ten Million dollars ("$10,000,000.00") which are available to support ongoing business operations including methane digester projects. In addition, Dixie Creek Ranch maintains their treasury management services with Wells Fargo Bank.

Please feel free to contact me should you have any questions or required any additional information. You can reach me by phone at 559-622-3015 or email at Brett.M.Lew@wellsfargo.com.

Regards,

Brett Lew
Vice President
Relationship Manager



GENERATECAPITAL

Honorable Karen Ross
Secretary of California Dept of Food and Agriculture
1220 N Street
Sacramento, CA 96814

February 14, 2018

Re: Generate Capital, Inc. Financial Statements supporting Maas Energy Works DDRDP Applications

Dear Secretary Ross,

Generate Capital, Inc. ("Generate") is pleased to present to the California Department of Food and Agriculture information about our company that shows Generate has the ability to fund the capital needs for Common Hub equipment and digesters for all of Maas Energy Works 2018 DDRDP applications.

Attached to this letter as Exhibit A you will find a proof of funds letter from Wells Fargo showing a cash balance in excess of $22 million in an account owned by Generate. In addition to the proof of funds, Generate has significant funds immediately available for investment upon further capital calls from a $200 million fundraising that was closed in September 2017. The press release from this fundraising is included herein as Exhibit B.

It is our policy that we do not provide financial statements in circumstance where they could become public information. However, we are happy to allow up to two of your representatives to review our financial information in physical form in person at our office.

Sincerely,

Jigar Shah

Jigar Shah
President & Co-Founder
Generate Capital, Inc.

Exhibit A: Proof of Funds Letter from Wells Fargo

WELLS FARGO

Global CleanTech Group
45 Fremont Street, 7th Floor
San Francisco, CA 94105

Fax: 866-512-9719

February 6, 2018

To Whom It May Concern:

This is to confirm that our client, Generate Capital Inc., has been with Wells Fargo Bank since 2014 and current balance in account is approximately $22MM.

Feel free to contact me with any questions.

Mina Tran
VP, Relationship Manager, CleanTech Group
Wells Fargo Corporate Banking | 45 Fremont Street, 7th Floor | San Francisco, CA 94105
Phone 415-396-5202
Fax 866-512-9719

mina.t.tran@wellsfargo.com

Exhibit B: Generate Capital Fundraising Press Release

https://www.bloomberg.com/news/articles/2017-10-24/generate-capital-raises-200-million-to-back-clean-energy

October 24, 2017

Generate Capital Inc., a clean-energy financing company, raised about $200 million in new equity to back battery-storage and other distributed-energy projects.

Alaska Permanent Fund Corp., a state-owned entity based in Juneau, led the round, San Francisco-based Generate said in a statement Tuesday.

Generate, which was formed in late 2014, invests in renewable-energy, energy-efficiency, waste, agriculture and water projects. It has supported on-site battery systems from Stem Inc., funded fuel-cell forklifts made by Plug Power Inc. and backed a water-treatment system used by Lagunitas Brewing Co. It recently collaborated with Sharp Electronics Corp. on microgrid projects in California with solar and storage.

"What we do say to these partners: we can be your partner forever -- genuinely -- because we don't have to sell our projects or our positions," Scott Jacobs, Generate's chief executive officer, said in an interview. "We can be permanent capital."

Generate focuses on projects often ignored by other financing companies: small projects that cost as little as $500,000. It structures deals like long-term equity facilities that let sponsors use the funding for multiple projects.

"It's inefficient to raise $500,000 for each project," Jacobs said. He co-founded Generate with Jigar Shah, who earlier founded SunEdison Inc., and investor Matan Friedman.

Generate, which also offers debt, has leveraged its own equity to support more than $500 million in projects, Jacobs said.

"Oftentimes, policymakers will mandate climate solutions to implement, but then they don't actually ensure that a project-finance partner is ready to support the roll-out," Shah said. "We naturally fill that role."

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1111 W. Lacey Boulevard, 93230
P. O. Box 1208
Hanford, California 93232
559-584-2681 FAX: 559-584-9075
www.FarmCreditWest.com

February 6, 2018

California Department of Food and Agriculture
Office of Grants Administration
1220 N Street, Room 120
Sacramento, CA 95814

Re: High Roller Dairy – Documentation of Matching Funds for Dairy Digester Research & Development Program (DDRDP) Grant Application

To whom it may concern,

It is my understanding that High Roller Dairy is in the process of applying for a DDRDP grant to help offset the cost of the installation of a dairy digester. Assuming High Roller Dairy is selected for a grant; this operation has funds available in the amount of $2.4MM on a revolving line of credit with Farm Credit West to provide the capital to complete the installation of the digester. Further documentation can be provided if necessary.

Please feel free to contact me with any questions.

Sincerely,

Lauren Evangelo

Lauren Evangelo
Vice President – Key Relationship Manager

GENERATECAPITAL

Honorable Karen Ross
Secretary of California Dept of Food and Agriculture
1220 N Street
Sacramento, CA 96814

February 14, 2018

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Jigar Shah
President & Co-Founder
Generate Capital, Inc.

Exhibit A: Proof of Funds Letter from Wells Fargo

Global CleanTech Group
45 Fremont Street, 7th Floor
San Francisco, CA 94105

Fax: 866-512-9719

February 6, 2018

To Whom It May Concern:

This is to confirm that our client, Generate Capital Inc., has been with Wells Fargo Bank since 2014 and current balance in account is approximately $22MM.

Feel free to contact me with any questions.

Mina Tran
VP, Relationship Manager, CleanTech Group
Wells Fargo Corporate Banking | 45 Fremont Street, 7th Floor | San Francisco, CA 94105
Phone 415-396-5202
Fax 866-512-9719

mina.t.tran@wellsfargo.com

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WELLS FARGO

Kings-Tulare Commercial Banking Office
MAC A0846-011
3300 S. Demaree Street
Visalia, CA 93277

Tel: 559 622 3000
Fax: 559 738 1403

February 16, 2018

California Department of Food and Agriculture (CDFA)
Dairy Digester Research and Development Program
1220 N Street, Suite 400
Sacramento, CA 95814

Re: Bernard Te Velde dba Lone Oak Farms

To Whom It May Concern:

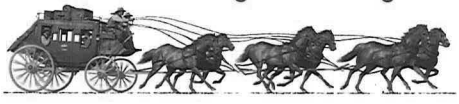
Bernard Te Velde dba Lone Oak Farms has been a valued customer of Wells Fargo Bank since 2001 and maintains a satisfactory borrowing relationship. Lone Oak Farms maintains a borrowing relationship with commitments totaling Thirty Five Million dollars ("$35,000,000.00") which are available to support ongoing business operations including methane digester projects. In addition, Lone Oak Farms maintains their treasury management services with Wells Fargo Bank.

Please feel free to contact me should you have any questions or required any additional information. You can reach me by phone at 559-622-3015 or email at Brett.M.Lew@wellsfargo.com.

Regards,

Brett Lew
Vice President
Relationship Manager

Together we'll go far



GENERATECAPITAL

Honorable Karen Ross
Secretary of California Dept of Food and Agriculture
1220 N Street
Sacramento, CA 96814

February 14, 2018

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Jigar Shah

Jigar Shah
President & Co-Founder
Generate Capital, Inc.

Exhibit A: Proof of Funds Letter from Wells Fargo

Global CleanTech Group
45 Fremont Street, 7th Floor
San Francisco, CA 94105

Fax: 866-512-9719

February 6, 2018

To Whom It May Concern:

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Feel free to contact me with any questions.

Mina Tran
VP, Relationship Manager, CleanTech Group
Wells Fargo Corporate Banking | 45 Fremont Street, 7th Floor | San Francisco, CA 94105
Phone 415-396-5202
Fax 866-512-9719

mina.t.tran@wellsfargo.com

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February 6, 2018

California Department of Food and Agriculture
Office of Grants Administration
1220 N Street, Room 120
Sacramento, CA 95814

Re: River Ranch Farms, LLC – Documentation of Matching Funds for Dairy Digester Research & Development Program (DDRDP) Grant Application

To whom it may concern,

It is my understanding that River Ranch Farms, LLC is in the process of applying for a DDRDP grant to help offset the cost of the installation of a dairy digester. Assuming River Ranch Farms, LLC is selected for a grant; this operation has funds available in the amount of $4.2MM on a revolving line of credit with Farm Credit West to provide the capital to complete the installation of the digester. Further documentation can be provided if necessary.

Please feel free to contact me with any questions.

Sincerely,

Lauren Evangelo

Lauren Evangelo
Vice President – Key Relationship Manager

MAAS ENERGY WORKS

Lakeside Pipeline LLC

Pro Forma Income Statement

Capital Costs	Amount
Hub Development, Cleanup, and Utility Costs	$ 8,194,305
Biogas Collection Lines	$ 5,833,811
Biogas Treatment at Dairies	$ 3,493,484
Working Capital	$ -
Total Capital Costs	$ 17,521,600

Financing	Amount
AB 2313 Funding	$ -
Pilot Project Funding	$ 9,327,295
Other Grants	$ -
Equity Cash Contribution	$ 2,100,000
Debt	$ 6,094,305
Total Financing Package	$ 17,521,600

	Production Year 1	Production Year 2	Production Year 3	Production Year 4	Production Year 5
Wet Cow Equivalent	33,852	33,852	33,852	33,852	33,852
Biogas Production (MMBTU)	533,688	533,688	533,688	533,688	533,688
Operating Revenues					
RNG Energy Value	1,601,064	1,601,064	1,601,064	1,601,064	1,601,064
RNG LCFS Value	22,580,913	22,580,913	22,580,913	22,580,913	22,580,913
RNG RIN Value	10,908,583	10,908,583	10,908,583	10,908,583	10,908,583
Gross Revenue	**$ 35,090,559**	**$ 35,090,559**	**$ 35,090,559**	**$ 35,090,559**	**$ 35,090,559**
Expenses					
Biogas Brokerage and Transport	$ (7,719,923)	$ (8,070,829)	$ (8,421,734)	$ (9,123,545)	$ (9,825,357)
Gathering Line O&M	$ (234,190)	$ (240,045)	$ (246,046)	$ (252,197)	$ (258,502)
Hub H2S Polishing O&M	$ (266,844)	$ (273,515)	$ (280,353)	$ (287,362)	$ (294,546)
CO-2 Membrane O&M	$ (160,106)	$ (164,109)	$ (168,212)	$ (172,417)	$ (176,728)
Compressor and other Mechnanical O&M	$ (213,475)	$ (218,812)	$ (224,282)	$ (229,889)	$ (235,637)
Electrical Consumption (all components)	$ (1,408,936)	$ (1,444,160)	$ (1,480,264)	$ (1,517,270)	$ (1,555,202)
Hub Site Lease	$ (87,726)	$ (87,726)	$ (87,726)	$ (87,726)	$ (87,726)
Hub Operating Expenses	**$ (10,091,201)**	**$ (10,499,196)**	**$ (10,908,617)**	**$ (11,670,408)**	**$ (12,433,697)**
EBITDA	**$ 24,999,358**	**$ 24,591,364**	**$ 24,181,942**	**$ 23,420,152**	**$ 22,656,862**
Debt Service	**$ (1,526,358)**	**$ (1,526,358)**	**$ (1,526,358)**	**$ (1,526,358)**	**$ (1,526,358)**
Earnings before Split with Digester Companies	**$ 23,473,000**	**$ 23,065,006**	**$ 22,655,584**	**$ 21,893,794**	**$ 21,130,504**
Payments to Digester Companies	**$ (18,778,400)**	**$ (18,452,004)**	**$ (18,124,467)**	**$ (17,515,035)**	**$ (16,904,403)**
Earnings					
Net Earnings	**$ 4,694,600**	**$ 4,613,001**	**$ 4,531,117**	**$ 4,378,759**	**$ 4,226,101**

MAAS ENERGY WORKS

Lakeside Pipeline LLC

Pro Forma Balance Sheet

Capital Costs	Amounts
Hub Development, Cleanup, and Utility Costs	$ 8,194,305
Biogas Collection Lines	$ 5,833,811
Biogas Treatment at Dairies	$ 3,493,484
Working Capital	$ -
Total Capital Costs	$ 17,521,600

Financing	Amount
AB 2313 Funding	$ -
Pilot Project Funding	$ 9,327,295
CDFA Grants	$ -
Equity Cash Contribution	$ 2,100,000
Debt	$ 6,094,305
Total Financing Package	$ 17,521,600

	At Start-Up	Production Year 1	Production Year 2	Production Year 3	Production Year 4	Production Year 5
Assets						
Cash on Hand	$ 250,000	$ 4,944,600	$ 9,557,601	$ 14,088,718	$ 18,467,477	$ 22,693,578
Lakeside Biogas Conditioning Facility	$ 17,521,600	$ 17,521,600	$ 17,521,600	$ 17,521,600	$ 17,521,600	$ 17,521,600
Accumulated Depreciation	$ -	$ (1,664,552)	$ (3,329,104)	$ (4,993,656)	$ (6,658,208)	$ (8,322,760)
Total Assets	**$ 17,771,600**	**$ 20,801,648**	**$ 23,750,097**	**$ 26,616,662**	**$ 29,330,869**	**$ 31,892,418**
Liabilities						
Long-Term Liability - Construction Loan (5 yr)	$ 6,094,305	$ 5,713,179	$ 5,301,563	$ 4,857,018	$ 4,376,909	$ 3,858,392
Equity						
Paid in Capital - Shareholder	$ 2,350,000	$ 2,350,000	$ 2,350,000	$ 2,350,000	$ 2,350,000	$ 2,350,000
Retained Earnings	$ 9,327,295	$ 12,738,469	$ 16,098,534	$ 19,409,644	$ 22,603,959	$ 25,684,026
Total Liabilities and Equity	**$ 17,771,600**	**$ 20,801,648**	**$ 23,750,097**	**$ 26,616,662**	**$ 29,330,869**	**$ 31,892,418**

MAAS ENERGY WORKS

Lakeside Pipeline LLC

Pro Forma Cash Flow Statement

Capital Costs	Amounts
Hub Development, Cleanup, and Utility Costs	$ 8,194,305
Biogas Collection Lines	$ 5,833,811
Biogas Treatment at Dairies	$ 3,493,484
Working Capital	$ -
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CDFA Grants	
Equity Cash Contribution	$ 2,100,000
Debt	$ 6,094,305
Total Financing Package	$ 17,521,600

	At Start-Up	Production Year 1	Production Year 2	Production Year 3	Production Year 4	Production Year 5
Cash at Beginning of Period	$ 250,000	$ 250,000	$ 4,944,600	$ 9,557,601	$ 14,088,718	$ 18,467,477
Operations Activities						
Cash Flow - Operations	$ -	$ 6,220,958	$ 6,139,359	$ 6,057,475	$ 5,905,117	$ 5,752,459
Investing Activities						
Equity from Shareholders	$ 2,100,000	$ -	$ -	$ -	$ -	$ -
Pilot Project Funding	$ 9,327,295	$ -	$ -	$ -	$ -	$ -
Lakeside Pipeline Hub	$ (17,521,600)	$ -	$ -	$ -	$ -	$ -
Cash Flow - Investment	$ (6,094,305)	$ -	$ -	$ -	$ -	$ -
Financing Activities						
Cash Flow - Financing	$ 6,094,305	$ (1,526,358)	$ (1,526,358)	$ (1,526,358)	$ (1,526,358)	$ (1,526,358)
Cash at end of Period	$ 250,000	$ 4,944,600	$ 9,557,601	$ 14,088,718	$ 18,467,477	$ 22,693,578

Lakeside Pipeline LLC

Pro Forma Financials - Assumptions Table

Assumptions	Info Source	Year 1 (all quarters)	Year 2 (all quarters)	Year 3 (all quarters)	Year 4 (all quarters)	Year 5 (all quarters)
Revenues and Markets						
Total Annual Biogas Production (MMBTU)	Project Narrative, MEW Operating History, no expansion	533,688	533,688	533,688	533,688	533,688
Total Project MT Avoided Methane CO-2e	ARB GHG Calculation Tool, no expansion	152,342	152,342	152,342	152,342	152,342
Additional LCFS benefit from avoided fossil (pounds per MMBTU)	USEPA EIA	117	117	117	117	117
Natural Gas Price per MMBTU	OPIS SoCalGas CityGate Average, with low rise forecast	$3.00	$3.00	$3.50	$3.75	$4.00
D3 RIN Price per GGE Cellulosic Ethanol	OPIS, MEW amalgamated industry forecast	$1.75	$1.50	$1.50	$1.25	$1.25
LCFS Price per MT CO-2e	ARB Market Forecast, December 2017.	$ 125	$ 125	$ 125	$ 125	$ 115
Brokerage and Transport (includes CNG station revenue share)	Maas Energy Works Market Research, reflects rising cost of accessing CNG stations as more dairy RNG supply comes online faster than demand for CNG grows	22%	23%	24%	26%	28%
CAPEX						
Biogas Collection Lines	PISCE	$ 5,833,811	n/a	n/a	n/a	n/a
Hub Development, Cleanup, and Utility Costs	PISCE	$ 8,194,305	n/a	n/a	n/a	n/a
Biogas Treatment at Dairies	PISCE	$ 3,493,484	n/a	n/a	n/a	n/a
OPEX						
Note that the Pilot Project Solicitation asked for some O&M costs to be listed monthly or quarterly. We have done this where practical, but in many cases a rate per unit of flow was more accurate.						
Total Linear Feet of Gathering Lines	PISCE (no expansion)	121,342	121,342	121,342	121,342	121,342
Gathering Line Monitoring O&M Cost per foot, monthly	Calgren Dairy Fuels Estimate	$ 0.040	$ 0.041	$ 0.042	$ 0.043	$ 0.044
Gathering Line Repair O&M Cost per foot, monthly	Calgren Dairy Fuels Estimate	$ 0.100	$ 0.103	$ 0.105	$ 0.108	$ 0.110
Gathering Line USA North Marking O&M cost per foot, monthly	Calgren Dairy Fuels Estimate	$ 0.021	$ 0.021	$ 0.022	$ 0.022	$ 0.023
CO-2 Membrane O&M, per MMBTU	SCS Engineers	$ 0.300	$ 0.308	$ 0.315	$ 0.323	$ 0.331
H2S Polishing at Hub, per MMBTU	SCS Engineers	$ 0.500	$ 0.513	$ 0.525	$ 0.538	$ 0.552
Compressor, Chiller and Other Mechanical O&M, per MMBTU	SCS Engineers	$ 0.400	$ 0.410	$ 0.420	$ 0.431	$ 0.442
Electrical Consumption, kWh per MMBTU	SCS Engineers	24.00	24.00	24.00	24.00	24.00
Electrical Cost (energy plus demand charges)	Utility Ag Tariff	$ 0.110	$ 0.113	$ 0.116	$ 0.118	$ 0.121
Hub Ground Lease (% of Gross revenue)	Lease Agreement	0.25%	0.25%	0.25%	0.25%	0.25%
Digester Operating Costs per WCE	MEW Estimate	$ 60.00	$ 61.50	$ 63.04	$ 64.61	$ 66.23
On-Dairy Gas Treatment Costs per MMBTU	MEW Estimate	$ 3.100	$ 3.178	$ 3.257	$ 3.338	$ 3.422
Annual Cost Inflation	MEW Estimate	2.5%	2.5%	2.5%	2.5%	2.5%
Financing						
Working Capital - Cash on Hand	Farm Credit West, Rabobank, Wells Fargo, Chase Bank	$250,000	n/a	n/a	n/a	n/a
Owners' Cash Down Payment	Farm Credit West, Rabobank, Wells Fargo, Chase Bank	$2,100,000	n/a	n/a	n/a	n/a
Bank Interest Rate (for Digesters)	Farm Credit West, Rabobank, Wells Fargo	6%	6%	6%	6%	6%
Digester Debt Term	Farm Credit West, Rabobank, Wells Fargo	10	10	10	10	10
Bank Interest Rate (for Conditioning Hub)	Farm Credit West, Rabobank, Wells Fargo	8%	8%	8%	8%	8%
Conditioning Hub Debt Term	Farm Credit West, Rabobank, Wells Fargo	5	5	5	5	5
% Free Cash Flow to Digesters Entities	Per Feedstock Agreement	80%	80%	80%	80%	80%

MAAS ENERGY WORKS

Decade Centralized Dairy (Digester #1)

Pro Forma Income Statement

Capital Costs - Digester	**$ 2,955,735**
Financial Model	**Farmer-Owned**

	Development	Production	Production	Production	Production	Production
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Wet Cow Equivalent		4,952	4,952	4,952	4,952	4,952
RNG						
Total Income From Pipeline Company		**$ 3,003,619**	**$ 3,003,619**	**$ 3,003,619**	**$ 3,003,619**	**$ 3,003,619**
Gross Income		**$ 3,003,619**	**$ 3,003,619**	**$ 3,003,619**	**$ 3,003,619**	**$ 3,003,619**
Expenses						
Development, Construction & Startup	**$ 2,955,735**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Digester Operating Expenses		$ (297,114)	$ (304,542)	$ (312,156)	$ (319,960)	$ (327,959)
On-Dairy Gas Treatment O&M		$ (242,012)	$ (248,062)	$ (254,264)	$ (260,620)	$ (267,136)
Total Expense	**$ (2,955,735)**	**$ (539,126)**	**$ (552,604)**	**$ (566,420)**	**$ (580,580)**	**$ (595,095)**
Earnings						
Net Earnings	**$ (2,955,735)**	**$ 2,464,493**	**$ 2,451,015**	**$ 2,437,200**	**$ 2,423,039**	**$ 2,408,525**