BALDWIN COMPRESSOR STATION SKID MOUNTED RECIPROCATING COMPRESSOR UNIT
EQUIPMENT PURCHASE AGREEMENT NO. 19-00226

This Agreement, entered into as of the ~~27th day of November 2019~~ 3rd day of December 2019 J.M ("Effective Date") by and between Peoples Gas System, a division of Tampa Electric Company ("Peoples Gas"), whose address is 702 North Franklin Street, Tampa, Florida 33602 and UEC, LLC ("Seller"), whose address is 9461 Willow Court, Henderson, CO 80640, constitutes the agreement between Peoples Gas and Seller which includes this Form of Agreement and the following documents:

Exhibit A General Conditions
Exhibit B Commercial Terms
Exhibit C Specification for Purchasing of Skid Mounted Reciprocating Compressor Units, Rev. 2, Updated for Purchase, dd. 11/25/2019

EQUIPMENT TO BE PROVIDED, OR WORK TO BE PERFORMED: Seller shall provide all labor, supervision, materials (except materials specifically identified as being furnished by Peoples Gas), design and professional services, shop, facilities, tooling, equipment, consumables, and any and all other items and services required to fully perform and complete the manufacture, fabrication and assembly of the Skid Mounted Reciprocating Compressor Units for the Baldwin Compressor Station as more fully described in EXHIBIT C, SPECIFICATION ("Equipment").

SCHEDULE: The Work shall be performed in accordance with the milestone dates set forth in the schedule described in Exhibit B, Commercial Terms.

COMPENSATION: Seller's full compensation for the satisfactory performance and completion of all the Work and delivery of the Equipment in compliance with all terms and conditions of this Agreement shall be as set forth in Exhibit B, Commercial Terms.

ORDER OF PRECEDENCE: All contract documents are essential parts of this Agreement and a requirement occurring in one is binding as though occurring in all. Unless expressly provided otherwise herein, in case of conflict between any of the contract documents the order of precedence shall be as follows: (i) This Form of Agreement; (ii) Exhibit B, Commercial Terms; (iii) Exhibit A, General Conditions; and (iv) Exhibit C, Specification.

This Agreement contains the entire agreement between the parties and supersedes all previous proposals, understandings, correspondence and/or agreements, either oral or written.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

Peoples Gas System, a division of
Tampa Electric Company

By: _____

Name: Richard L. Wall

Title: V.P. Engineering & CPO

UEC, LLC

By: Jack Maley

Name: Jack Maley

Title: C.E.O.

Peoples Gas System, a division of
Tampa Electric Company (2nd Req'd. Signature)

By: _____

Name: John Pellerin

Title: Director Procurement

EXHIBIT B
COMMERCIAL TERMS

1.0 EQUIPMENT PURCHASE

Seller shall supply all material and labor to manufacture and deliver the Skid Mounted Reciprocating Compressor Units as more fully described in Exhibit C, Specification for Purchasing of Skid Mounted Reciprocating Compressor Units, Rev. 2, Updated for Purchase.

2.0 PRICING AND TERMS OF PAYMENT

2.1 Peoples Gas shall pay Seller the total firm lump sum of Three Million Six Hundred and Seventy-Five Thousand Two Hundred and Thirty-Eight Dollars and Eighty Cents ($3,675,238.80), including freight to Baldwin Compressor Station, Bryceville, FL and all appropriate taxes. The following schedule of values applies:

ITEM	DESCRIPTION	UNIT PRICE	QUANTITY	EXTENDED PRICE
1	Base Skid System (including compressor, engine, process cooler, air emission control equipment, controls system, structural skid assembly etc.)	$1,587,000.00	2	$3,174,000.00
2	API 618, 5th Edition Design Approach 3a Studies (formerly M2-M5)	Included	2	Included
3	3rd Party Torsional Study	Included	2	Included
4	Start-Up Spare Parts (oil filter elements, rupture discs, gaskets etc.)	Included	2 lots	Included
5	½" Kiene Valves (each cylinder; suction and discharge)	Included	2	Included
6	Non-standard Technical Documentation (Instrument Catalogue Sheets, Instrument ISA Data Sheets, Safety Relief Valve calculations, Vessel Drawings, Vessel and Piping MTR's, Mechanical Compressor Test, Noise Impact Assessment [compressor, main motor, bypass valve, relief valve, cooler] - by third party)	Included	2	Included
7	Yokogawa Coriolis-type In-Line Mass Flow Meter	Included	2	Included
8	Ariel Hand Pump (lube purge)	Included	2	Included
9	Skid Seismic Study	Included	2	Included
10	Noise Impact Assessment Study	Included	2	Included
11	Suction Pressure Control Valve (6" Becker PCV - ship loose)	$34,000.00	2	$68,000.00
12	Ball Valve w/Handwheel (12" – ship loose)	$14,100.00	2	$28,200.00
13	Swing Check Valve (12" – ship loose)	$11,500.00	2	$23,000.00
14	Pressure Control Mounted On-Skid	$35,500.00	2	$71,000.00
15	Orifice Plates for Pulsation Tuning	$140.00	2	$280.00
16	Waukesha Electric Engine Starter	$3,800.00	2	$7,600.00
17	Waukesha Emergency Spare Parts (does not include fluids)	$22,550.00	2	$45,100.00
18	Waukesha Commissioning Spare Parts	$1,360.00	2	$2,720.00
19	Ariel Special Tools	$8,500.00	2	$17,000.00
20	Ariel JGK/4 Compressor Spares (refer to Appendix A for details)	$1,019.40	2	$2,038.80
21	On-site S/U & Commissioning Services	$35,000.00	2	$70,000.00

22	Freight Skid Mounted Comp. Package	$65,000.00	2	$130,000.00
23	Freight Process Coolers	$18,150.00	2	$36,300.00
	TOTAL			**$3,675,238.80**

2.2 The on-site start-up and commissioning support services has been estimated to include two (2) service technicians (one (1) Waukesha Certified tech and one (1) controls engineer). Additional start-up and field services shall be mutually agreed upon between Peoples Gas and the Seller.

2.3 Freight Summary (see 2.1 above): Freight has been estimated at $65,000 per skid-mounted compressor package and $18,150.00 per process cooler. Total estimated freight is $166,300.00, which includes Seller cost for shipping insurance. A total, firm freight cost will be applied at time of shipment.

2.4 The following milestone payments shall apply (includes items 1-22, 26 and 27 from Section 2.1 above):

1. 10% Upon Receipt of Order for major materials purchase/order
2. 10% Upon Approval of IFC Drawings
3. 30% Upon Verified receipt of Engine at UEC
4. 40% Upon verified receipt of Compressor at UEC
5. 10% Upon delivery to Jobsite, not to exceed 30 days from Ready To Ship (RTS) Date

Freight charges and On-site services (items 23-25, Section 2.1 above) shall be paid as actuals. Freight to be paid upon delivery to Jobsite. On-site start-up and commissioning services to be paid when fully completed.

2.5 Payment terms are Net 30 Days.

3.0 TAXES

In conjunction with the general condition entitled "TAXES, DUTIES AND FEES" of Exhibit A General Conditions, Seller is not furnishing Equipment deemed exempt from Florida Sales and Use Taxes. Seller shall add such tax to its invoice and shall collect such taxes from Tampa Electric and pay such taxes to the State of Florida; provided however, that, if Seller is not registered in the State of Florida and is not required to collect Florida State Sales or Use Taxes, no such amount shall show on the invoice and Peoples Gas shall pay such taxes directly to the State of Florida.

4.0 DELIVERY SCHEDULE

On-site delivery, and ready for final assembly, of each of the fully fabricated components of the skid-mounted, reciprocating compressor system shall conform to the delivery schedule below:

4.1	Receipt of Preliminary P&ID's:	6 weeks AEDOA
4.2	Receipt of Preliminary GA Drawings:	8 weeks AEDOA
4.3	Receipt of IFC Drawings for PGS Approval:	10 weeks AEDOA
4.4	Receipt of Engine at UEC (Denver, CO):	On/Before 12/31/2019
4.5	Receipt of Compressor at UEC (Denver, CO):	24 weeks AEDOA
4.6	Notification of Ready to Ship (RTS) (from Denver, CO):	34 weeks AEDOA
4.7	Delivery to Job Site (Bryceville, FL):	38 weeks AEDOA

AEDOA – After Effective date of Agreement

5.0 SHIPPING AND DELIVERY INSTRUCTIONS

5.1 The Equipment described in Clause 1.0 above shall be delivered to the address below, freight Pre-Pay and Add (Best Way), and title shall pass to Peoples Gas upon delivery.

TECO Peoples Gas
Baldwin Compressor Station
10411 US 301
Bryceville, FL 32009
Attn: Alex Bernedo-Martinez
813.228.1056
abernedomartinez@tecoenergy.com

5.2 If applicable, Seller shall provide a copy of shipping instructions to all sub-suppliers making shipments directly to Peoples Gas Jobsite.

5.3 A copy of the signed bill of lading and the original packing list must accompany all shipments. Both documents must include the following information: (i) purchase order number; (ii) Seller's name; (iii) date of shipment; (iv) itemized list of goods (quantity ordered and quantity shipped); and (v) actual weight of dunnage.

5.4 Delivery of material and equipment consignments to Peoples Gas Jobsite will be accepted between the hours of 8:00 AM and 3:00 PM during the normal workweek, excluding Holidays, Monday through Friday only. No shipments outside of these delivery windows will be accepted until the following workday unless prior arrangements have been made and agreed to in writing.

5.5 Seller shall provide notice of shipment 30 days prior to delivery. The carrier shall contact Peoples Gas forty-eight (48) hours prior to arrival at the destination. On day of shipment, email/mail one (1) copy of bill of lading and packing list to Peoples Gas at the address set forth in Paragraph 5.1 above.

6.0 INVOICING INSTRUCTIONS

6.1 All invoices shall show each item and be completed in accordance with Section 2.0 PRICING AND TERMS OF PAYMENT above. The invoice shall be accompanied by any other documentation as may be required by this Agreement. The invoice shall show the complete Agreement Number on each page of the invoice as well as Peoples Gas's internal purchase order number **4500XXXXXX** which is issued for pay purposes only. THE INTERNAL PURCHASE ORDER NUMBER MUST APPEAR ON EACH INVOICE.

Each invoice, including all required documentation, shall be e-mailed to apgas@tecoenergy.com and to Alex Bernedo-Martinez at abernedomartinez@tecoenergy.com Or, alternatively, the invoice, including all required documentation, can be mailed to:

TECO Peoples Gas
P.O. Box 3285
Tampa, FL 33601
Attention: Accounts Payable

7.0 CORRESPONDENCE

All notices and correspondence related to this Agreement, except for Technical Transmittals and Correspondence and Inspection Notifications as set forth in Clauses 9.0 and 10.0 respectively, shall be in writing, shall reference the Agreement Number and Title and shall be deemed to be validly given when received by the other party at the address indicated below:

Peoples Gas

Peoples Gas
Attn: Bob Bertig
702 N. Franklin Street
Tampa, Florida 33602
813.228.4615
rgbertigjr@tecoenergy.com

UE Compression

UE Compression
Attn: Tom Sawyer
9641 Willow Court
Henderson, CO 80640
713.253.7834
tsawyer@uecompression.com

8.0 EXPEDITING

8.1 Within one (1) week of the post award project kick-off meeting, Seller shall furnish to Peoples Gas the following information: (i) shop order number; (ii) name of Seller's factory contact, including address, telephone number, facsimile number and e-mail address; and (iii) complete schedule of key milestones, including completion of engineering, procurement, key subassemblies, and final assembly.

8.2 As the work progresses, Seller shall supply Peoples Gas with detailed monthly progress report. Details of this report shall be included in a post award kick-off meeting between Peoples Gas and the Seller.

8.3 Seller shall supply the number and sizes of special shipping saddles, cradles, pallets, or other support devices, if any, along with disposition instructions.

8.4 The above information shall be provided to Peoples Gas at the address set forth below:

Peoples Gas
Baldwin Compressor Station
Attn: Alex Bernedo-Martinez
702 N. Franklin Street
Tampa, Florida 33602
813.228.1056
abernedomartinez@tecoenergy.com

and

Peoples Gas
Baldwin Compressor Station
Attn: Tyson Dabney
702 N. Franklin Street
Tampa, Florida 33602
813.228.1407
twdabney@tecoenergy.com

9.0 TECHNICAL TRANSMITTALS AND CORRESPONDENCE

All drawings and/or reproducible, documents, manuals, parts lists, and technical correspondence, in quantities as called for herein, shall be submitted via a "Document Transmittal Form" to the address set forth below:

Peoples Gas
Baldwin Compressor Station
Attn: Tyson Dabney
702 N. Franklin Street
Tampa, Florida 33602
813.228.1407
twdabney@tecoenergy.com

and

Peoples Gas
Baldwin Compressor Station
Attn: Alex Bernedo-Martinez
702 N. Franklin Street
Tampa, Florida 33602
813.228.1056
abernedomartinez@tecoenergy.com

10.0 INSPECTION NOTIFICATIONS

Peoples Gas may inspect the Equipment prior to shipment by giving reasonable notice to Seller. All notifications for inspections or tests which are to be observed by Peoples Gas shall be forwarded at least ten (10) calendar days in advance of scheduled inspections/tests to the address set forth below:

Peoples Gas
Baldwin Compressor Station
Attn: Tyson Dabney
702 N. Franklin Street
Tampa, Florida 33602
813.228.1407
twdabney@tecoenergy.com

and

Peoples Gas
Baldwin Compressor Station
Attn: Alex Bernedo-Martinez
702 N. Franklin Street
Tampa, Florida 33602
813.228.1056
abernedomartinez@tecoenergy.com

11.0 PACKAGING

11.1 Seller shall prepare all equipment for shipment and for a maximum outdoor storage period of six months (long-term storage). Seller will ensure that tagging and markings are suitable for such long-term storage in open conditions. Peoples Gas's Agreement Number, item number, equipment and/or tag number(s) and shipping weights shall appear on all containers, crates, bags, vessels, etc., as well as shipping papers and packing lists.

11.2 Seller shall prepare all items for shipment per the requirements of Attachment 1, "UE Compression, LLC Shipping Procedure" and Attachment 2, "UE Compression Fabricated Unit Inspection and Test Traveler" which are hereby attached to and made part of this Agreement.

11.3 The equipment shall be prepared for shipment after shop tests, if any, have been completed. Lifting points shall be clearly marked, temporary structural bracing shall be installed as required to allow for normal field handling, skidding and hoisting and all openings shall be tightly closed.

11.4 Equipment that is leak tested in the shop by Seller shall be completely drained and blown dry by air when practical, prior to shipment. When such drainage requires the removal of plugs, drain valves, or other parts, Seller shall reinsert or reassemble such parts prior to shipment.

11.5 Equipment supplied with space heaters shall have heater leads accessible without uncrating, and no flammable material shall be located near the heaters such that energization of heaters, without uncrating, will not pose a fire threat.

12.0 SPECIAL NOTES

12.1 Seller shall furnish Safety Data Sheets (SDS) related to any shipping/storage of oils, preservatives, desiccants, or other related material, furnished with purchased equipment or material. Toxic or hazardous preservatives shall not be used. Each type of preservative used shall be identified as to quality, life expectancy and type. In addition to the Safety Data Sheets, Seller shall furnish detailed instructions describing the handling and removal of each type of preservative used.

12.2 For any equipment or material requiring special storage, care in handling, or other special warehousing requirements, Seller shall furnish a copy/description of the special requirements and related recommendations with the delivery of the specific item.

12.3 All vessel and piping Material Test Reports (MTR's) and vessel U1A reports shall be shipped concurrently with the Equipment to the Peoples Gas's Jobsite. These documents may be shipped separately from the Equipment and directly to the Peoples Gas Project Manager in lieu of shipment with the equipment. Receipt of these and all other required documents shall constitute complete delivery of Equipment.

12.4 For all material requiring unloading equipment (i.e., forklift, cherry picker, crane, etc.), Seller shall direct all less than truckload and full truckload carriers to utilize a flatbed or open top truck. All material shall be adequately protected from adverse weather conditions.

13.0 LATE DELIVERY AND DELAY OF COMMERCIAL OPERATION

Seller and Peoples Gas acknowledge and agree that any failure to ship by the ship date specified in this Agreement shall directly cause substantial damage to Peoples Gas in such amount and to such extent as cannot be calculated presently with reasonable certainty. Therefore, Seller hereby warrants and agrees to pay to Peoples Gas, as liquidated damages, and not as a penalty, the following:

For every day late after the agreed upon ready to ship date from UEC shop date as specified in this Agreement the following LD's shall apply:

Days 1-5:	$ 5,512.86/day
Days 6-10:	$ 9,188.10/day
Days 11-20:	$ 22,051.43/day
Total Cap:	$ 183,761.94 (5% of contract value)

13.1 All liquidated damages shall be paid by Seller within ten (10) days after they become due. Peoples Gas shall be entitled to deduct from any amounts which may be due Seller under this Agreement the amount of any liquidated damages which may be payable pursuant to this Agreement. Peoples Gas's remedy entitling it to liquidated damages as specified in this Section shall be Peoples Gas's sole and exclusive remedy for Seller's failure to meet the scheduled delivery date and Seller's delay of Peoples Gas due to Seller's repair or replacement of equipment. The parties acknowledge and agree that the liquidated damages provided herein are reasonable in light of the anticipated or actual loss that would be caused by Seller's failure to meet the scheduled delivery date and Seller's delay of Peoples Gas due to Seller's repair or replacement of equipment. The remedy of liquidated damages specified in this Section shall not limit Peoples Gas's other available remedies for Seller's breach of or failure to perform any other provision of this Agreement. Payment of liquidated damages does not relieve Seller of the obligation to meet the scheduled delivery date.

14.0 PERFORMANCE TESTING AND PERFORMANCE GUARANTEES

14.1 Performance Testing

14.1.1 For the purposes of this Agreement, Field Acceptance Testing, as described in Exhibit C, Section I, Paragraph 4.0, Field Acceptance, shall mean Performance Testing.

14.1.2 Performance Tests shall be performed in accordance with manufacturer's instructions, to determine whether the Performance Guarantees have been achieved.

14.2 Performance Guarantees

14.2.1 Performance Guarantees Achieved – If the Performance Tests establish that the Performance Guarantees set forth in the Attachments listed below have been achieved, Peoples Gas shall issue written Acceptance within thirty (30) days thereafter.

Attachment 3 – Compressor Performance Guarantee (Ariel)
Attachment 4 – Engine Performance (Waukesha)
Attachment 5 – Cooler Performance (AXH Air-Coolers)

14.2.2 Performance Guarantees Not Achieved – If the Performance Tests establish that the Performance Guarantees have not been achieved, then the following shall apply:

The Seller shall make all necessary corrections and modifications within 15 days of the failed performance test date. Upon completion of necessary corrections and to allow the unit to meet Seller's guarantees, an immediate retest of the unit shall be completed. If engine, compressor or cooler cannot meet the performance warranty specifications in a retest, Peoples Gas and Seller will mutually agree on remedy due to deficient performance and all related costs will be negotiated between Peoples Gas and the Seller.

15.0 BACKCHARGES

15.1 If Peoples Gas exercises a self-help remedy as provided in this Agreement, due to Seller's inability to remedy, Peoples Gas may back charge Seller the costs therefor which costs shall include: (i) the actual cost of materials delivered to the site of the Work; and (ii) the actual cost incurred by third party contractor(s) directly related to performing the corrective action; and (iii) the actual cost for equipment and tool rentals used in performing the corrective work.

15.2 The cost of such work and material shall be borne by Seller and if the same is not paid upon presentation by Peoples Gas invoices relating thereto, such costs may be deducted by Peoples Gas from any amounts due or to become due Seller.

16.0 TECHNICAL FIELD ASSISTANCE

Seller shall provide an adequate number of qualified and competent personnel to provide the Technical Field Assistance, including, but not limited to OEM engineers, OEM field technicians, project engineers, project managers, etc. Seller shall not transfer or remove any of its Technical Field Assistance personnel from the work without prior written approval of Peoples Gas. Should any Technical Field Assistance personnel be deemed by Peoples Gas, in its sole judgment, to be objectionable, such personnel shall be removed from the job site immediately following Peoples Gas's request and shall be promptly replaced by Seller.

Seller shall provide technical Field Assistance for installation, start-up and field services per Attachment 6, "Standard Rates for Start-up and Field Services, Natural gas, Effective 7/1/2016". This rate schedule is hereby attached and is made part of this Agreement.

17.0 SAFETY AND SITE RULES

17.1 Seller shall comply with all applicable federal, state and local laws, including without limitation, the Occupational Safety and Health Act of 1970 (84 U.S.C. 1950), as amended, and any state plans approved thereunder and regulations thereunder to the extent applicable, requirements of Peoples Gas governing conduct of Seller at and about the job site, codes, regulations and ordinances and all licenses, permits and approvals needed to carry-out and perform such Technical Field Assistance.

17.2 Seller shall have in place a site/job specific safety and health plan that meets Peoples Gas and OSHA requirements. The program shall include job site cleanliness, personal protective equipment, hazard communications, emergency procedures (e.g., medical, hurricane, natural gas, etc.), drug and alcohol use prevention, and emergency procedures.

17.3 Seller is responsible for their employees and those involved in the project/site including subcontractors. Peoples Gas reserves the authority to approve or prevent workers, subcontractors, etc. from working on Peoples Gas sites or projects.

17.4 Seller shall ensure that any contractor and subcontractor working under their direction are aware of and adhere to the safety requirements and are adequately supervised. The Seller shall stop work conducted in an unsafe manner or during unsafe conditions that may present a risk to people, property or the environment.

17.5 Seller must participate in safety orientation meetings with Peoples Gas while performing the Work. Seller shall either conduct or participate in daily safety meetings for all on-site employees assigned to the Work.

17.6 When work is performed on a Peoples Gas system, Seller verifies that it has received copies of, and has reviewed, does understand and fully accept the terms, conditions, specifications and other performance requirements set forth in the Construction Standards Manual.

18.0 ON-SITE INCIDENT REPORTING

18.1 Seller shall report all on-site incidents to Peoples Gas that include, but are not limited to injuries, illnesses, vehicle collisions, near misses, damages to pipeline facilities or other property, environmental spills, etc.). All incidents must be reported within 24 hours to a Peoples Gas Supervisor and the Peoples Gas safety department representative. Peoples Gas reserves the right to review all incident, investigation and root cause reports, regardless of severity, while Seller is working on a Peoples Gas project.

19.0 PIPELINE SAFETY

19.1 Seller shall maintain a Pipeline and Hazardous Materials Safety Administration (PHMSA) compliant drug and alcohol program that covers any employee who may at any time work on a project contracted through Peoples Gas. The program must include appropriate testing per PHMSA requirements. It is the sole responsibility of the Seller to update and maintain all original documentation, provide copies of documentation as requested, and provide quarterly testing reports to Peoples Gas. Seller shall ensure all sub-contractors are in compliance with PHMSA and shall be solely responsible for sub-contractor failure to abide by these regulations.

UE COMPRESSION, LLC.
FABRICATION PROCEDURE
UNIT SHIPPING

SDF037.3 REV. APR. 09, 2009

Shipping procedure

1. Pre-shipment preparation

1.1. Verify the unit fabrication is complete. Refer to the inspection and test traveler (SDQ003.4) for this project.

1.2. Verify the functional testing is complete. Refer to the inspection and test traveler (SDQ003.4) for this project.

1.3. Verify the final inspections have been completed. Refer to the inspection and test traveler (SDQ003.4) for this project.

1.4. Verify as built dimensions and other items have been recorded on the drawings.

1.5. Verify the unit has received the required storage preservation in accordance with the Long Term Storage procedure SDF047.3.

1.6. Remove all masking tape that was applied for paint protection. Remove the shrink wrap from the coupling.

1.7. Perform final inspection of the paint system. Record on the inspection and test traveler (SDQ003.4) for this project.

1.8. Perform the final Vibracon mounting chock weather protection. The exposed internal threaded portion shall be brushed with grease. The entire chock shall be wrapped with cosmoline paper then shrink wrapped. The shrink wrap shall be secured with weather resistant tape.

1.9. Apply all required warning stickers and UEC identification stickers.

1.10. Apply the UEC unit identification hard tag.

1.11. All open connections on the unit shall be closed or covered to prevent any contamination by transportation.

1.11.1. All flanged openings shall be closed with blind flanges, bolted plywood covers or conventional plastic flange covers. All methods of closing shall include gaskets or cosmoline paper and shrink wrap plastic in conjunction with weather resistant tape to give a water tight seal.

1.11.2. All threaded openings including couplings shall be closed with plastic or steel plugs and/or caps.

1.12. All instrumentation susceptible to transportation damage, including temperature and pressure gauges, gauge glasses, etc., shall be protected from damage during shipment. Protection shall be via bubble wrap with shrink wrap and/or a suitable weather resistant tape shall be used.

1.13. The control panel shall be protected from shipping damage. The front of the control panel shall be covered with bubble wrap and card board and secured in place with shrink wrap and/or weather resistant tape.

1.14. Be aware that the duct tape will leave a significant amount of adhesive on the surface when it is removed, especially if it is in place until it starts to degrade. Where possible secure protection materials with shrink wrap and secure the shrink wrap with the weather resistant tape.

1.15. Verify that all ship loose components are accounted for. Verify that all ship loose components are listed on packing lists.

1.16. All small ship loose components shall be protected and secured in boxes. These boxes shall be physically attached to the unit skid with steel strapping tape where possible.

2. Shipment

2.1. Due to possible vibration damage of instrumentation, all fabricated units shall be shipped on "air-ride" equipped trucks and trailers. Units shall not be loaded on any truck or trailer that is not equipped with an "air-ride" suspension.

2.2. Units shall be loaded such that the equipment rides flat on the trailer. If a double drop trailer is utilized it shall have a long enough well to allow the unit to ride flat in the well.

2.2.1. If it is not possible to locate a long enough double drop trailer, the unit can be supported on cribbing to provide a flat condition.

2.3. The unit will be located on the truck as to give the best ride and the most protection from road hazards.

2.4. The unit shall be secured to the truck with nylon shipping straps or chains. If chains are used, care must be taken to insure that the coating on the unit is not damaged.

2.5. The driver and the truck shall be properly insured and trained to handle the load.

2.6. The driver or trucking company is responsible to secure whatever permits or permissions that might be required for the safe and legal transportation of the unit.

2.7. Upon completion of the safe loading of the unit, the inspection and test traveler (SDQ003.2) for this project shall be signed and dated.

ATTACHMENT 2
(total 6 pages)

UECOMPRESSION

FABRICATED UNIT

INSPECTION AND TEST TRAVELER

JOB NUMBER _____

UNIT NUMBER _____

CUSTOMER _____

CUSTOMER ORDER # _____

JOB DESCRIPTION _____

DATE: _____

PROJECT ENGINEER _____

PROJECT FABRICATION LEAD _____

General instructions for using this sheet.

The intention of the sheet is to delete all the rows that do not apply.

Leave the top row of each section even through nothing else may exist. For instance the Building section (7) frequently will be empty. Leave row 7.0.

The idea is that when the Traveler is complete, every row should be signed.

- Enter the project specific data on this first page.
- Delete the rows that do not apply.
- Delete this text box when using this form.

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
		INCOMING INSPECTIONS						
1.0	**RECEIVING INSPECTION**							
1.1		RECEIVE PARTS FROM WAREHOUSE, CHECK PHYSICAL PARTS AGAINST THE BOM FOR QTY & PART #						ON GOING PROCESS
1.2		PHASE 1 – VESSEL						
1.3		PHASE 2 – PRE-FAB WELD						
1.4		PHASE 3 – MAJORS						
1.5		PHASE 4 – FAB WELD						
1.6		PHASE 5 – ASSEMBLY						
1.7		PHASE 6 – SHIP LOOSE						
1.8		SPARE PHASE						
2.0	**LEVEL II INSPECTIONS**							
2.1		SKID INSPECTION						
2.2		PROCESS SUCTION SCRUBBERS / FILTERS DIMENSIONS AND CLEANLINESS						
2.3		PROCESS DISCHARGE SCRUBBERS / FILTERS DIMENSIONS AND CLEANLINESS						
2.4		PULSATION BOTTLES DIMENSIONS AND CLEANLINESS						
2.5		PULSATION BOTTLE INTERNALS ARE CORRECT						
2.6		GAS/OIL SEPARATOR DIMENSIONS AND CLEANLINESS						
2.7		PROCESS FILTER ELEMENTS INSTALLED CORRECTLY						
2.8		FABRICATED OIL FILTERS DIMENSIONS AND CLEANLINESS						
2.9		PROPER OIL FILTER ELEMENTS INSTALLED CORRECTLY						
2.10		OTHER VESSELS DIMENSIONS AND CLEANLINESS						
2.11		COOLER INSPECTION DIMENSIONS AND CLEANLINESS						
2.12		CONTROL PANEL INSPECTION						
2.13		EQUIPMENT DRIVE COUPLINGS						
2.14		SKID LEVEL ON SHOP FLOOR						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
		IN PROCESS INSPECTIONS						
3.0	**SKID FABRICATION**							

EN – Engineer, PLM – Production Lead Man, PF – Production Foreman, WLM – Weld Lead Man, WF – Weld Foreman, QCI Quality Control Inspector, QCM – Quality Control Manager, ST – Service Technician , WM – Warehouseman, PM – Production Manager, PTLM – Paint Lead Man

INSP.	HOLD	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
3.1		VERIFY MATERIAL PER BOM						
3.2		VERIFY WELDERS ARE QUALIFIED TO WELD TO THE BOM SPECIFIED WPS						
3.3		VERIFY MATERIAL CUTTING, PREPARATION, WELD TAC-UPS AND BEAM PLACEMENT PER SKID DRAWING AND AWS WELD SPECIFICATION.						
3.4		DIMENSIONALLY CHECK THE SKID FOR CONFORMANCE PER SKID AND ANCHOR BOLT LAYOUT DRAWINGS						
3.5		INSPECT THE SKID FOR WARPAGE, 1/8" PER 10' MAX						
3.6		PERFORM VISUAL ON SKID						
3.7		VERIFY SURFACE PREP. FOR PAINT MEETS BOM						
3.8		VERIFY PAINT MEETS BOM						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
IN PROCESS INSPECTIONS CONTINUED								
4.0	MAJOR EQUIPMENT PLACEMENT AND ALIGNMENT							
4.1		VERIFY COMPRESSOR PLACEMENT PER G.A. DRAWING PRIOR TO GROUT						
4.2		VERIFY CORRECT VERTICAL VESSEL PLACEMENT						
4.3		VERIFY CORRECT HORIZONTAL VESSEL PLACEMENT						
4.4		VERIFY CORRECT OIL COOLER PLACEMENT						
4.5		VERIFY CORRECT WATER COOLER PLACEMENT						
4.6		VERIFY CORRECT PROCESS COOLER PLACEMENT						
4.7		VERIFY CORRECT OIL PUMP PLACEMENT						
4.8		VERIFY CORRECT WATER PUMP PLACEMENT						
4.9		VERIFY CONTROL PANEL/TERMINAL BOX PLACEMENT						
4.10		PERFORM PHYSICAL COMPRESSOR CHECKS PER SDQ012 FRAME FLAT, CYL PRELOAD, SOFT FOOT, ETC						
4.11		PERFORM ALIGNMENT CHECKS PER SDQ012 AND PLACE REPORT IN FILE						
4.12		VISUALLY INSPECT THE COUPLING BOLT CORRECT ORIENTATION.						
4.13		PERFORM PHYSICAL DRIVER CHECKS PER SDQ012 SOFT FOOT, ETC						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
IN PROCESS INSPECTIONS CONTINUED								
5.0	PIPING FABRICATION							
5.1		DIMENSIONALLY CHECK EDGE OF SKID CONNECTION PER G.A. DRAWING DURING FIT-UP						
5.2		PERFORM NDE ON PIPE PER BOM						
5.3		REVIEW AND APPROVE NDE ON PIPE PER BOM						
5.4		REVIEW AND APPROVE HYDROTEST PER BOM						
5.5		PERFORM PIPE CLEANING PER BOM						
5.6		VERIFY SURFACE PREP. FOR PAINT MEETS BOM						
5.7		VERIFY PAINT MEETS BOM						
5.8		VERIFY PIPE IS NOT IN EXCESSIVE STRAIN AFTER INSTALLATION						

INSP.	HOLD	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD	ACCEPTED	COMMENTS

EN – Engineer, PLM – Production Lead Man, PF – Production Foreman, WLM – Weld Lead Man, WF – Weld Foreman, QCI Quality Control Inspector, QCM – Quality Control Manager, ST – Service Technician , WM – Warehouseman, PM – Production Manager, PTLM – Paint Lead Man

PT.	POINT		NCR#	DATE	INIT.	DATE	INIT.	
IN PROCESS INSPECTIONS CONTINUED								
6.0	FABRICATION							
6.1		MOUNTING BOTTLE AND VESSELS. ADD PRESERVATION PER THE STORAGE PROCEDURE TO COMPONENTS WHILE GOING ON.						
6.2		OIL SYSTEM THREADED PIPE ASSEMBLY – PER DRAWINGS, CORRECTLY ASSEMBLED, CLEAN, TIGHT, STRAIGHT						
6.3		PROCESS SYSTEM THREADED PIPE ASSEMBLY – PER DRAWINGS, CORRECTLY ASSEMBLED, CLEAN, TIGHT, STRAIGHT						
6.4		AUX SYSTEM THREADED PIPE ASSEMBLY – PER DRAWINGS, CORRECTLY ASSEMBLED, CLEAN, TIGHT, STRAIGHT						
6.5		FLANGE MAKE UP – TORQUING COMPLETED AND MARKED PER STANDARD UEC PROCESS						
6.6		CLEANLINESS DURING FABRICATION – LOOK FOR ROUNDED CORNERS, BEEBEES, CAULKING, ETC.						
6.7		PIPE CLAMP, WEDGE BLOCK TIGHT AND SUPPLIED WITH UEC STANDARD JAMB NUT COMBINATION						
6.8		VERIFY UNIT PRESERVATION COMPLETED						
6.9		VERIFY THAT THE FINAL VIBRACON MOUNTING CHOCK WEATHER PROTECTION WAS PERFORMED CORRECTLY						
6.10		VERIFY AS BUILT DIMENSIONS AND OTHER ITEMS HAVE BEEN RECORDED ON THE DRAWINGS.						
6.11		VERIFY THAT THE MOTOR ROTOR IS LOCKED IF THE MOTOR IS SHIPPING SEPARATELY.						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD	ACCEPTED	COMMENTS
7.0	ELECTRICAL AND INSTRUMENTATION				
7.1		VERIFY ALL INSTRUMENTATION IS INSTALLED CORRECTLY			
7.2		VERIFY ALL TUBING MEETS BOM – MANUFACTURER, SIZE AND THICKNESS.			
7.2		VERIFY ALL TUBING IS INSTALLED CORRECTLY – TIGHTENED WITH PROPER ASSEMBLY			
7.3		VERIFY ALL ELECTRICAL WIRING AND CONDUIT MEETS BOM AND ELECTRICAL CODE			
7.4		VERIFY ALL CHECK VALVES ARE INSTALLED FOR PROPER FLOW			
7.5		VERIFY ALL SOLENOID VALVES ARE INSTALLED FOR PROPER FLOW			
7.6		VERIFY ALL THERMOSTATIC CONTROL VALVES ARE INSTALLED FOR PROPER FLOW			
7.7		VERIFY ALL DIFFERENTIAL PRESSURE DEVICES ARE INSTALLED CORRECTLY			

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
IN PROCESS INSPECTIONS CONTINUED								
8.0	BUILDING DESIGN AND FABRICATION							
8.1		VERIFY BUILDING DESIGN MEETS REQUIREMENTS						
8.2		VERIFY BUILDING ORDERED PER BOM						
8.3		VERIFY DRAWINGS ARE PE STAMPED (AS REQUIRED)						
8.4		VERIFY BUILDING APPLICATION APPLIED FOR						
8.5		VERIFY BUILDING APPLICATION APPROVED						
8.6		VERIFY ALL PARTS PER BOM ARE RECEIVED						
8.7	YES	**WARNING!** INSPECT BUILDING MATERIAL FOR SHARP EDGES, BURRS DEFECTS THAT CAN CAUSE INJURY.						
8.8		VERIFY ASSEMBLY MATCHES PLANS						

EN – Engineer, PLM – Production Lead Man, PF – Production Foreman, WLM – Weld Lead Man, WF – Weld Foreman, QCI Quality Control Inspector, QCM – Quality Control Manager, ST – Service Technician , WM – Warehouseman, PM – Production Manager, PTLM – Paint Lead Man

INSP.	HOLD	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
8.9		VERIFY BUILDING SQUARE FIT AND FINISH						
8.10		LEAK TEST ALL GAS HEATER PIPING						
8.11		VERIFY BUILDING ELECTRICAL IS COMPLETE PER FABRICATION DRAWINGS AND SPECIFICATIONS						
8.12		VERIFY FUNCTIONALITY OF ALL BUILDING ELECTRICAL COMPONENTS						
8.13		BUILDING INSPECTOR SIGN OFF						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
IN PROCESS INSPECTIONS CONTINUED								
9.0	FUNCTIONAL TEST							
9.1		VERIFY CONTROL PANEL CHECKOUT PER SDQ012						
9.2		VERIFY EQUIPMENT CHECKOUT PRIOR TO SHOP TEST PER SDQ012						
9.3		PERFORM RUN TEST ON OIL CIRCUIT						
9.4		PERFORM TEST RUN THE COMPLETE UNIT						
9.5		PERFORM LONG TERM STORAGE PRESERVATION PER SDQ047 AND THE LEVEL IDENTIFIED IN THE FABRICATION REQUIREMENTS						
9.6		VERIFY EQUIPMENT CHECKOUT DURING/AFTER SHOP TEST PER SDQ012						
9.7		UNIT PNEUMATIC LEAK TEST WITH ULTRASONIC DEVICE AND REPORT PLACED IN FILE						
9.8		AUXILIARY SYSTEM LEAK CHECKS						
9.9		HEATER SUPPLY GAS LEAK CHECKS						
9.10		VERIFY TERMINAL WIRING IN JUNCTION BOX						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
FINAL INSPECTIONS								
10.0	RELEASE TO PAINT							
10.1		VERIFY UNIT COMPLETENESS PER P&ID DRAWING						
10.2		DIMENSIONALLY CHECK EDGE OF SKID CONNECTION PER G.A. DRAWING AT FINAL ASSEMBLY						
10.3		UNIT FABRICATION COMPLETE						
10.4		ENGINEERING TESTING COMPLETE						
10.5		QC INSPECTIONS COMPLETE						
10.6		COMPRESSOR/DRIVER CHECKS COMPLETED						
10.7		RELEASE UNIT TO PAINT						
11.0	PAINT							
11.1		PRESSURE WASH THE UNIT						
11.2		FINAL MASKING AFTER WASH BEFORE PAINT						
11.3		INSPECT FOR HOLIDAYS, DRIPS RUNS AND ERRORS						
11.4		PRODUCE PAINT INSPECTION REPORT						

INSP.	HOLD	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD	ACCEPTED	COMMENTS

EN – Engineer, PLM – Production Lead Man, PF – Production Foreman, WLM – Weld Lead Man, WF – Weld Foreman, QCI Quality Control Inspector, QCM – Quality Control Manager, ST – Service Technician , WM – Warehouseman, PM – Production Manager, PTLM – Paint Lead Man

PT.	POINT		NCR#	DATE	INIT.	DATE	INIT.	
FINAL INSPECTIONS								
12.0	FINAL INSPECTION							
12.1		VERIFY UNIT TAGGING IS PER P&ID AND BOM						
12.2		VERIFY THAT UEC UNIT IDENTIFICATION HARD TAG IS APPLIED						
12.3		VERIFY UNIT HAS APPROPRIATE WARNING TAGS AND UEC STICKERS						
12.4		VERIFY THAT ALL MASKING TAPE AND SHRINK WRAP THAT WAS APPLIED FOR PAINT PROTECTION IS REMOVED.						
12.5		TAKE PHOTOS OF COMPLETED UNIT						
12.6		VERIFY BUILDING COMPLETENESS PER FABRICATION DRAWINGS						
12.7		VERIFY ALL NCR'S HAVE BEEN DISPOSITIONED AND CLEARED						
12.8		VERIFY THAT ALL SHIP LOOSE ITEMS IDENTIFIED ON THE PACKING LISTS HAVE BEEN CRATED						
12.9		TAKE PHOTOS OF ALL SHIP LOOSE ITEMS						
12.10		FINAL UNIT INSPECTION						
12.11		UNIT IS RELEASED FOR SHIPMENT						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
FINAL INSPECTIONS								
13.0	SHIPMENT							
13.1		UNIT AND ALL LOOSE PARTS ARE SAFELY LOADED ON A TRUCK						
13.2		VERIFY THAT ALL OPEN CONNECTIONS ON THE UNIT ARE CLOSED OR COVERED TO PREVENT ANY CONTAMINATION BY TRANSPORTATION PER SDF037.						
13.3		ALL INSTRUMENTATION SUSCEPTIBLE TO TRANSPORTATION DAMAGE, INCLUDING TEMPERATURE AND PRESSURE GAUGES, GAUGE GLASSES, ETC., SHALL BE PROTECTED FROM DAMAGE DURING SHIPMENT.						
13.4		THE CONTROL PANEL SHALL BE PROTECTED FROM SHIPPING DAMAGE.						
13.5		ALL SMALL SHIP LOOSE COMPONENTS SHALL BE PROTECTED AND SECURED IN BOXES. VERIFY THAT THESE BOXES ARE PHYSICALLY ATTACHED TO THE UNIT SKID WITH STEEL STRAPPING TAPE WHERE POSSIBLE.						
13.6		VERIFY THAT ALL FABRICATED UNITS ARE SHIPPED ON "AIR-RIDE" EQUIPPED TRUCKS AND TRAILERS. UNITS SHALL NOT BE LOADED ON ANY TRUCK OR TRAILER THAT IS NOT EQUIPPED WITH AN "AIR-RIDE" SUSPENSION.						
13.7		VERIFY THAT THE UNIT IS LOADED SUCH THAT THE EQUIPMENT RIDES FLAT ON THE TRAILER. IF A DOUBLE DROP TRAILER IS UTILIZED IT SHALL HAVE A LONG ENOUGH WELL TO ALLOW THE UNIT TO RIDE FLAT IN THE WELL. IF IT IS NOT POSSIBLE TO LOCATE A LONG ENOUGH DOUBLE DROP TRAILER, THE UNIT CAN BE SUPPORTED ON CRIBBING TO PROVIDE A FLAT CONDITION.						
13.8		VERIFY THAT THE UNIT IS LOCATED ON THE TRUCK AS TO GIVE THE BEST RIDE AND THE MOST PROTECTION FROM ROAD HAZARDS.						
13.9		VERIFY THAT THE UNIT IS SECURED TO THE TRUCK WITH NYLON SHIPPING STRAPS OR CHAINS. IF CHAINS ARE USED, CARE MUST BE TAKEN TO INSURE THAT THE COATING ON THE UNIT IS NOT DAMAGED.						

INSP. PT.	HOLD POINT	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
			NCR#	DATE	INIT.	DATE	INIT.	
FINAL DOCUMENTATION								
14.0	FINAL DOCUMENTATION							

EN – Engineer, PLM – Production Lead Man, PF – Production Foreman, WLM – Weld Lead Man, WF – Weld Foreman, QC Quality Control Inspector, QCM – Quality Control Manager, ST – Service Technician , WM – Warehouseman, PM – Production Manager, PTLM – Paint Lead Man

INSP.	HOLD	INSPECTION AND TEST ACTIVITY	NON-CONFORMANCE HOLD			ACCEPTED		COMMENTS
14.1		UPDATE BOM						
14.2		REVISE DRAWINGS TO REFLECT "AS BUILT"						
14.3		SEND O&M MANUALS						

EN – Engineer, PLM – Production Lead Man, PF – Production Foreman, WLM – Weld Lead Man, WF – Weld Foreman, QCI Quality Control Inspector, QCM – Quality Control Manager, ST – Service Technician , WM – Warehouseman, PM – Production Manager, PTLM – Paint Lead Man

COMPRESSOR PERFORMANCE GUARANTEE

Ariel Corporation
35 Blackjack Rd
Mount Vernon, OH 43050

10/24/19
UECompression, TECO Services
Subject: Baldwin Compressor Station Performance Guarantee

Dear Mr. Ben Hettler,

This letter is to be presented to TECO Services — Baldwin Compressor Station, as a performance guarantee certificate.

COMPRESSOR PERFORMANCE GUARANTEE
Ariel Corporation will guarantee the design point on the attached performance calculation for each compressor. This performance is calculated by the current version of the "Ariel Reciprocating Compressor Performance Program." All other performance is "expected" and is not guaranteed. At this guarantee design point, the performance is based on the gas conditions at the cylinder flanges. Performance testing for the guarantee design point must be done in accordance with section 2-2 of the Packager's Standards.

The calculated capacity at the calculated BHP/MMSCFD is guaranteed to a tolerance of ± 3%. The ± 3% is applied to the calculated flow of 36 MMSCFD as shown on the performance run attached.

Best Regards,

Patrick Campbell

Patrick Campbell
Ariel Corporation
Applications Engineering
Phone: 740-397-0311
Fax: 740-397-3856
pcampbell@arielcorp.com

Attached: Performance Run (design), Gas Analysis (design)

Ariel Performance

Company:	UECompression		Customer:	TECO Services	
Quote:	19-0352		Inquiry:	19-042	
7.7.7.0 Case 1:	Design		Project:	Baldwin Compressor Station	

Compressor Data:						Driver Data:	
Elevation,ft:	100.00	Barmtr,psia:	14.642	Ambient,F:	105.00	Type:	Nat. Gas
Frame: (ELP)	JGK/4	Stroke, in:	5.50	Rod Dia, in:	2.000	Mfg:	Waukesha
Max RL Tot, lbf:	74000	Max RL Tens, lbf:	37000	Max RL Comp, lbf:	40000	Model:	L7044GSI
Rated RPM:	1200	Rated BHP:	2540.0	Rated PS FPM:	1100.0	BHP:	1429
Calc RPM:	902.4	BHP:	1353	Calc PS FPM:	827.2	Avail:	1429

Services	Service 1			
Gas Model	VMG-APRNGL2			
Stage Data:	1	—	—	—
Target Flow, MMSCFD	35.000	—	—	—
Flow Calc, MMSCFD	36.000	—	—	—
BHP per Stage	1334.5	—	—	—
Specific Gravity	0.6025	—	—	—
Ratio of Sp Ht (N)	1.2990	—	—	—
Comp Suct (Zs)	0.9114	—	—	—
Comp Disch (Zd)	0.9122	—	—	—
Pres Suct Line, psig	500.00	—	—	—
Pres Suct Flg, psig	494.85	—	—	—
Pres Disch Flg, psig	1010.15	—	—	—
Pres Disch Line, psig	1000.00	—	—	—
Pres Ratio F/F	2.011	—	—	—
Temp Suct, F	75.00	—	—	—
Temp Clr Disch, F	125.00	—	—	—
Cylinder Data:	**Throw 1**	**Throw 2**	**Throw 3**	**Throw 4**
Cyl Model	8-3/8KU	8-3/8KU	8-3/8KU	8-3/8KU
Cyl Bore, in	7.875	7.875	7.875	7.875
Cyl RDP (API), psig	1722.7	1722.7	1722.7	1722.7
Cyl MAWP, psig	1895.0	1895.0	1895.0	1895.0
Cyl Action	DBL	DBL	DBL	DBL
Cyl Disp, CFM	270.8	270.8	270.8	270.8
Pres Suct Intl, psig	476.71	476.71	476.71	476.71
Temp Suct Intl, F	79	79	79	79
Pres Disch Intl, psig	1045.28	1045.28	1045.28	1045.28
Temp Disch Intl, F	183	183	183	183
HE Suct Gas Vel, FPM	6392	6392	6392	6392
HE Disch Gas Vel, FPM	5580	5580	5580	5580
HE Spcrs Used/Max	0/2	0/2	2/2	2/2
HE Vol Pkt Avail, %	No Pkt	5.97+75.78	No Pkt	No Pkt
Vol Pkt Used, %	No Pkt	81.75 (F) %	No Pkt	No Pkt
HE Min Clr, %	19.34	19.34	19.34	19.34
HE Total Clr, %	19.34	101.09	30.65	30.65
CE Suct Gas Vel, FPM	5678	5678	5678	5678
CE Disch Gas Vel, FPM	5220	5220	5220	5220
CE Spcrs Used/Max	4/4	4/4	4/4	4/4
CE Min Clr, %	21.52	21.52	21.52	21.52
CE Total Clr, %	45.71	45.71	45.71	45.71
Suct Vol Eff HE/CE, %	81.2/62.3	23.0/62.3	73.1/62.3	73.1/62.3
Disch Event HE/CE, ms	15.0/14.8	7.2/14.8	14.0/14.8	14.0/14.8
Suct Pseudo-Q HE/CE	4.3/3.2	3.4/3.2	4.3/3.2	4.3/3.2
Gas Rod Ld Comp, %	73.0 C	73.0 C	73.0 C	73.0 C
Gas Rod Ld Tens, %	66.0 T	66.0 T	66.0 T	66.0 T
Gas Rod Ld Total, %	72.4	72.4	72.4	72.4
Xhd Pin Deg/%Rvrsl lbf	166/65.0	160/95.9	172/68.8	172/68.8
Flow Calc, MMSCFD	10.382	6.053	9.783	9.783
Cyl BHP	385.3	223.4	362.9	362.9

Gas Analysis Data

ARIEL

	Company:	UECompression	Customer:	TECO Services	UEC
	Quote:	19-0352	Inquiry	19-042	
7.7.7.0	Case 1:	Design	Project:	Baldwin Compressor Station	

Services	**Service**		
Gas Model	VMG-APRNGL2		
Gas Type	FIELDGAS		
Stage	**# 1**	**# 1**	**Final**
Stream	**Main**	**Vapor**	**Vapor**
Suction Press, psig	500.00	494.85	1000.00
Disch Press, psig		1010.15	1000.00
Suction Temp, F	75.00	75.00	125.00
Disch Temp, F		183.15	125.00
Flow, MMSCFD	36.000	36.000	36.000
Flow, lb/h	68979.4	68979.4	68979.4
Flow, GPM			
Dropout, %			
Specific Gravity	0.6025	0.6025	0.6025
Mole Weight	17.45	17.45	17.45
Ratio of Sp Ht (N)		1.2990	N/A
Comp Suct (Zs)		0.9114	0.8842
Comp Disch (Zd)		0.9122	0.8842
Humidity	100.00	100.00	
WATER	0.09461	0.09461	0.09461
HYDROGEN	0.01470	0.01469	0.01469
CARBON DIOXIDE	0.02530	0.02528	0.02528
NITROGEN	0.05000	0.04995	0.04995
METHANE	95.00000	94.91012	94.91012
ETHANE	2.61000	2.60753	2.60753
PROPANE	1.00000	0.99905	0.99905
ISOBUTANE	0.30000	0.29972	0.29972
n-BUTANE	0.30000	0.29972	0.29972
n-PENTANE	0.20000	0.19981	0.19981
n-HEXANE	0.25000	0.24976	0.24976
n-HEPTANE	0.25000	0.24976	0.24976

Gas Analysis Data

ARIEL

Company: UECompression
Quote: 19-0352
7.7.7.0 Case 1: Design
Customer: TECO Services
Inquiry: 19-042
Project: Baldwin Compressor Station

UEC

Calculated Gas Properties:

Services	**Service**		
Gas Model	VMG-APRNGL2		
Gas Type	FIELDGAS		
Stage	**# 1**	**# 1**	**Final**
Stream	**Main**	**Vapor**	**Vapor**
Comp @ Std (Zstd)		0.9971	0.9971
Density @ Std, lb/ft3		0.046	0.046
Suction:			
Press, psig		494.85	1000.00
Temp, F		75.00	125.00
Density, lb/ft3		1.699	3.187
Enthalpy, Btu/lb		233.87	248.15
Entropy, Btu/lb·F		2.2132	2.1685
Speed of Sound, ft/s		1337.98	1402.89
Pseudo-Pc, psig		653.602	653.602
Pseudo-Tc, F		-100.84	-100.84
Cp, Btu/lb·F		0.5912	0.6503
Cv, Btu/lb·F		0.4203	0.4423
K		1.4066	1.4702
Z at Flange		0.9114	0.8842
Internal Energy, Btu/lb		178.4488	189.3542
JT Coefficient, F/psi		0.0628	0.0454
Viscosity, lb/ft·s		7.42e-06	8.27e-06
Thermal Cond., Btu/ft·h·F		2.25e-02	2.74e-02
NHV Mass, Btu/lb		21251.62	21251.62
Discharge:			
Press, psig		1010.15	1000.00
Temp, F		183.15	125.00
Density, lb/ft3		2.812	3.187
Enthalpy, Btu/lb		285.46	248.15
Entropy, Btu/lb·F		2.2283	2.1685
Speed of Sound, ft/s		1487.75	1402.89
Pseudo-Pc, psig		653.602	653.602
Pseudo-Tc, F		-100.84	-100.84
Cp, Btu/lb·F		0.6450	0.6503
Cv, Btu/lb·F		0.4620	0.4423
K		1.3962	1.4702
Z at Flange		0.9203	0.8842
Internal Energy, Btu/lb		218.1769	189.3541
JT Coefficient, F/psi		0.0371	0.0454
Viscosity, lb/ft·s		8.86e-06	8.27e-06
Thermal Cond., Btu/ft·h·F		2.97e-02	2.74e-02
NHV Mass, Btu/lb		21251.62	21251.62
Heat Load, BTU/h		2.59e+06	N/A

UEC QUOTE: 19-0352 rev.4
Baldwin Compressor Station

UECompression

ENGINE PERFORMANCE

Waukesha INNIO

VHP - L7044GSI S5

Gas Compression

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	Customer Catalyst
DISPLACEMENT (in3):	7040	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	9.7:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F)	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	100
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	11
ENGINE DRY WEIGHT (lbs):	24250	LUBE OIL CAPACITY (gal):	190
AIR/FUEL RATIO SETTING:	0.35% CO	MAX. EXHAUST BACKPRESSURE (in. H2O):	20
ENGINE SOUND LEVEL (dBA)	102.7	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	98.9

SITE CONDITIONS:

FUEL:		ALTITUDE (ft):	100
FUEL PRESSURE RANGE (psig):	43 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,055.1	FUEL WKI:	84.9
FUEL LHV (BTU/ft3):	951.0		

SITE SPECIFIC TECHNICAL DATA

POWER RATING	UNITS		MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 100 °F 100%	75%	50%
CONTINUOUS ENGINE POWER	BHP		1900	1900	1425	950
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		35.3	35.3	34.6	32.6
CONTINUOUS POWER AT FLYWHEEL	BHP		1900	1900	1425	950
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM		900 - 1200			
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7218	7218	7354	7802
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		7984	7984	8146	8630
FUEL FLOW *based on fuel analysis LHV*	SCFM		233	233	178	126
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		3758	3758	2986	2182
LUBE OIL (OC)	BTU/hr x 1000		469	469	435	387
INTERCOOLER (IC)	BTU/hr x 1000		683	683	382	154
EXHAUST	BTU/hr x 1000		3857	3857	2737	1890
RADIATION	BTU/hr x 1000		577	577	551	526
EMISSIONS (ENGINE OUT):						
NOx (NO + NO2)	g/bhp-hr		11.2	11.2	12.3	12.6
CO	g/bhp-hr		9.1	9.1	9.2	9.5
THC	g/bhp-hr		0.5	0.5	0.7	0.9
NMHC	g/bhp-hr		0.08	0.08	0.10	0.13
NM,NEHC (VOC)	g/bhp-hr		0.04	0.04	0.06	0.07
CO2	g/bhp-hr		442	442	451	478
CO2e	g/bhp-hr		453	453	466	497
CH2O	g/bhp-hr		0.050	0.050	0.050	0.050
CH4	g/bhp-hr		0.43	0.43	0.58	0.76
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		2566	2566	1954	1395
EXHAUST GAS MASS FLOW	lb/hr		11932	11932	9130	6452
EXHAUST GAS FLOW *at exhaust temp, 14.6 psia*	ACFM		8326	8326	6265	4356
EXHAUST TEMPERATURE	°F		1110	1110	1084	1059

HEAT EXCHANGER SIZING[2]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		4261
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		1306

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS		
JACKET WATER PUMP MIN. DESIGN FLOW	GPM	450
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	16
AUX WATER PUMP MIN. DESIGN FLOW	GPM	79
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	36

Waukesha
INNIO

VHP - L7044GSI S5

Gas Compression

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	95
Ethane	C2H6	2.61
Propane	C3H8	1
Iso-Butane	I-C4H10	0.3
Normal Butane	N-C4H10	0.3
Iso-Pentane	I-C5H12	0
Normal Pentane	N-C5H12	0.2
Hexane	C6H14	0.25
Heptane	C7H16	0.25
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	99.91
NON-HYDROCARBONS:		
Nitrogen	N2	0.05
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0
Carbon Monoxide	CO	0
Hydrogen	H2	0.0147
Water Vapor	H2O	0.09
	TOTAL FUEL	100.06

FUEL:	
FUEL PRESSURE RANGE (psig)*	43 - 60
FUEL WKI:	84.6
FUEL SLHV (BTU/ft3):	964.78
FUEL SLHV (MJ/Nm3):	37.94
FUEL LHV (BTU/ft3):	980.97
FUEL LHV (MJ/Nm3):	38.58
FUEL HHV (BTU/ft3):	1085.14
FUEL HHV (MJ/Nm3):	42.67
FUEL DENSITY (SG)	0.60

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1995-02-01[25, V(0,101.325)]
Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water. Waukesha recommends both of the following:
1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator
2) A fuel filter separator to be used on all fuels except commercial quality natural gas.
Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI* calculations.
* Trademark of INNIO Waukesha Gas Engines Inc.

FUEL CONTAMINANTS

Total Sulfur Compounds	0	% volume
Total Halogen as Cloride	0	% volume
Total Ammonia	0	% volume
Siloxanes		
Tetramethyl silane	0	% volume
Trimethyl silanol	0	% volume
Hexamethyldisiloxane (L2)	0	% volume
Hexamethylcyclotrisiloxane (D3)	0	% volume
Octamethyltrisiloxane (L3)	0	% volume
Octamethylcyclotetrasiloxane (D4)	0	% volume
Decamethyltetrasiloxane (L4)	0	% volume
Decamethylcyclopentasiloxane (D5)	0	% volume
Dodecamethylpentasiloxane (L5)	0	% volume
Dodecamethylcyclohexasiloxane (D6)	0	% volume
Others	0	% volume

Total Sulfur Compounds	0 µg/BTU
Total Halogen as Cloride	0 µg/BTU
Total Ammonia	0 µg/BTU
Total Siloxanes (as Si)	0 µg/BTU

Calculated fuel contaminant analysis will depend on the entered fuel composition and selected engine model

No water or hydrocarbon condensates are allowed in the engine. Requires liquids removal.

UEC QUOTE: 19-0352 rev.4
Baldwin Compressor Station

UECompression

Waukesha INNIO

VHP - L7044GSI S5

Gas Compression

ENGINE SPEED (rpm):	900	NOx SELECTION (g/bhp-hr):	Customer Catalyst
DISPLACEMENT (in3):	7040	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	9.7:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F):	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	100
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	11
ENGINE DRY WEIGHT (lbs):	24250	LUBE OIL CAPACITY (gal):	190
AIR/FUEL RATIO SETTING:	0.38% CO	MAX. EXHAUST BACKPRESSURE (in. H2O):	16
ENGINE SOUND LEVEL (dBA)	99.9	MAX. AIR INLET RESTRICTION (in. H2O)	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	94.5

SITE CONDITIONS:

FUEL:	Natural Gas	ALTITUDE (ft):	100
FUEL PRESSURE RANGE (psig)	40 - 60	MAXIMUM INLET AIR TEMPERATURE (°F)	105
FUEL HHV (BTU/ft3):	1,085.1	FUEL WKI:	84.8
FUEL LHV (BTU/ft3):	980.9		

SITE SPECIFIC TECHNICAL DATA

POWER RATING	UNITS		MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 105 °F		
				100%	70%	50%
CONTINUOUS ENGINE POWER	BHP		1425	1425	997	712
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		36.2	36.1	35.1	33.1
CONTINUOUS POWER AT FLYWHEEL	BHP		1425	1425	997	712
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM		900 - 1200			
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7040	7051	7263	7703
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		7788	7800	8034	8521
FUEL FLOW *based on fuel analysis LHV*	SCFM		170	171	123	93
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		2518	2542	2138	1678
LUBE OIL (OC)	BTU/hr x 1000		308	303	271	241
INTERCOOLER (IC)	BTU/hr x 1000		384	404	186	96
EXHAUST	BTU/hr x 1000		2564	2554	1775	1310
RADIATION	BTU/hr x 1000		526	511	477	455
EMISSIONS (ENGINE OUT)						
NOx (NO + NO2)	g/bhp-hr		10.5	10.5	11.6	11.5
CO	g/bhp-hr		8.7	8.7	8.8	9.1
THC	g/bhp-hr		0.7	0.7	0.8	0.9
NMHC	g/bhp-hr		0.10	0.10	0.12	0.14
NM,NEHC (VOC)	g/bhp-hr		0.05	0.05	0.06	0.07
CO2	g/bhp-hr		431	432	445	472
CO2e	g/bhp-hr		445	446	462	492
CH2O	g/bhp-hr		0.050	0.050	0.050	0.050
CH4	g/bhp-hr		0.55	0.56	0.68	0.79
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		1877	1880	1356	1027
EXHAUST GAS MASS FLOW	lb/hr		8729	8741	6303	4773
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM		5916	5921	4166	3101
EXHAUST TEMPERATURE	°F		1065	1064	1027	1002
HEAT EXCHANGER SIZING[1]						
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		3323			
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		807			

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS		
JACKET WATER PUMP MIN. DESIGN FLOW	GPM	343
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	10
AUX WATER PUMP MIN. DESIGN FLOW	GPM	60
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	21

All data provided per the conditions listed in the notes section on page three
Data Generated by EngCalc Program Version 4.0 INNIO Waukesha Gas Engines, Inc.
11/7/2019 1:01 PM

Waukesha
INNIO

VHP - L7044GSI S5

Gas Compression

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	95
Ethane	C2H6	2.61
Propane	C3H8	1
Iso-Butane	I-C4H10	0.3
Normal Butane	N-C4H10	0.3
Iso-Pentane	I-C5H12	0
Normal Pentane	N-C5H12	0.2
Hexane	C6H14	0.25
Heptane	C7H16	0.25
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	99.91
NON-HYDROCARBONS:		
Nitrogen	N2	0.05
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0
Carbon Monoxide	CO	0
Hydrogen	H2	0.0147
Water Vapor	H2O	0
	TOTAL FUEL	99.975

FUEL:	Natural Gas
FUEL PRESSURE RANGE (psig):	40 - 60
FUEL WKI:	84.8
FUEL SLHV (BTU/ft3):	963.87
FUEL SLHV (MJ/Nm3):	37.90
FUEL LHV (BTU/ft3):	980.94
FUEL LHV (MJ/Nm3):	38.57
FUEL HHV (BTU/ft3):	1085.11
FUEL HHV (MJ/Nm3):	42.67
FUEL DENSITY (SG):	0.60

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1995-02-01[25, V,0,101.325]
Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water. Waukesha recommends both of the following:
1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator.
2) A fuel filter separator to be used on all fuels except commercial quality natural gas.
Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI* calculations.
* Trademark of INNIO Waukesha Gas Engines Inc.

FUEL CONTAMINANTS

Total Sulfur Compounds	0	% volume
Total Halogen as Cloride	0	% volume
Total Ammonia	0	% volume
Siloxanes		
Tetramethyl silane	0	% volume
Trimethyl silanol	0	% volume
Hexamethyldisiloxane (L2)	0	% volume
Hexamethylcyclotrisiloxane (D3)	0	% volume
Octamethyltrisiloxane (L3)	0	% volume
Octamethylcyclotetrasiloxane (D4)	0	% volume
Decamethyltetrasiloxane (L4)	0	% volume
Decamethylcyclopentasiloxane (D5)	0	% volume
Dodecamethylpentasiloxane (L5)	0	% volume
Dodecamethylcyclohexasiloxane (D6)	0	% volume
Others	0	% volume

Total Sulfur Compounds	0 µg/BTU
Total Halogen as Cloride	0 µg/BTU
Total Ammonia	0 µg/BTU
Total Siloxanes (as Si)	0 µg/BTU

Calculated fuel contaminant analysis will depend on the entered fuel composition and selected engine model

No water or hydrocarbon condensates are allowed in the engine. Requires liquids removal

COOLER PERFORMANCE

AXH air-coolers
air-x-limited

401 E. Lowry Road
Claremore, OK 74017
info@axh.com

Phone (918) 283-9200
Fax (918) 283-9229
www.axh.com

					Proposal / Job No.	198314R2		
					Date	8/19/2019		
					Page	1 OF 1		
1	Purchaser	UE COMPRESSION			Ultimate User	TECO PEOPLES GAS		
2	Inquiry / PO#	19-0352			Destination	BALDWIN COMPRESSOR STATION		
3	# Units	2	Model	132-2ZF	Reference	L7044GSI / JGK4 1828HP		
4	Assembly	PACKAGED	Draft	FORCED	Overall Est. Size, Ft	SEE DRAWING	Est Wt	LBS
	THERMAL & MECHANICAL DESIGN							
5	Service	EJW	AUX-W	AC				
6	Flow	450GPM	79GPM	44.4MMSCFD				
7	Fluid	50%GLY	50%GLY	6025SPGR				
8	Temp. In / Out, °F	160.0 / 159.2	169.4 / 130.9	199.0 / 125.0				
9	Pressure, PSI			1010PSIG				
10	Pressure Drop, PSI	13.7	5.0	3.9				
11	Heat Load, BTU/HR	4346220	1393720	4079595				
12	True LMTD	41.2	29.7	33.8				
13	Overall Rate, U	162.1	142.8	108.7				
14	Fouling Factor	.0005	.0005	.0010				
15	Surface, Tube / Total, Sq Ft	560 / 12418	330 / 4916	1111 / 22006				
16	Sections, #	(1) - COMBINED	(1) - COMBINED	(1)				
17	Design Temp, °F Max / Min	300 / -20	300 / -20	350 / -20				
18	MWP / Test Press, PSIG	150 / 75	150 / 75	1200 / 1560				
19	Pass Arrangement	CROSSFLOW	CROSSFLOW	CROSSFLOW				
20	# Tube Rows	3	3	3				
21	# Tube Passes	2	2	2				
22	Tubes, OD x BWG	1X16	3/4X16	1-1/4X14				
23	Material	SA214 STEEL	SA214 STEEL	SA214 STEEL				
24	# Per Section / Length, Ft	62 / 36	47 / 36	95 / 36				
25	Turbulators							
26	Accelerators							
27	Fins, Type	HI-EFF	HI-EFF	HI-EFF				
28	Material	AL	AL	AL				
29	Nozzles, Rating / Type	150RF	150RF	600RF				
30	Material	SA105	SA105	SA105				
31	#-Inlets / Size In	(1) 6	(1) 3	(1) 10				
32	#-Outlets / Size In	(1) 6	(1) 3	(1) 10				
33	Headers, Type	REC TUBE	REC TUBE	BOX				
34	Material	A500	A500	SA516-70				
35	Corrosion Allow, In			.0625				
36	Grooved Tubesheet	SGL	SGL	DBL				
37	Plugs, Type	SHOULDER	TAPER	SHOULDER				
38	Plugs Material	STEEL	STEEL	A105 STEEL				
39	PWHT							
40	ASME Code & Nat'l Board			YES				
41	CRN							
42	Add'l Specs & Options							
43	API							
44	Louvers / Hail Screen	MAN / INT	MAN / INT	AUTO / INT				
45	Inspection / NDT			BX, UT				

FX= 100% X-Ray of all header seam, attachment & nozzle butt welds SX= Spot X-Ray of 1 long seam & 1 end closure, per header
BX= 100% X-Ray of all nozzle butt welds. UT = 100% UT of all header seam, attachment & nozzle butt welds. H = Hardness testing.

	AIR-SIDE PERFORMANCE		FAN DATA		DRIVER DATA	STRUCTURAL
46	Ambient Air Temp, In °F	105	Fan(s)	(2) MOORE-10K-36VT	Type	Guards FAN / DRIVE
47	Elevation, Ft	100	Blade Material	ALUMINUM	V-BELT DRIVE BY (2) 25HP,	MOTOR REMOVAL BEAM(S)
48	Air Flow, SCFM	280,976	HP / Fan	21.8	1800RPM, 460/60/3, TEFC, VFD	(1) MURPHY VS2EX PER FAN
49	Outlet Air Temp, °F	137.2	Dia, In / # Blades	132 / 8	COMP. MOTOR(S)	
50	Min Air Temp, °F	-20	RPM	253		
51			Tipspeed, FPM	6743		
52	Est. Noise Data: †	82 dBA @1m, 65 dBA @ 15m	Pitch, Deg	25.1		
53	Additional Info.					

STANDARD RATES FOR START-UP AND FIELD SERVICES

NATURAL GAS
Effective 7/1/2016

HOURLY RATES

Service Technician	$145.00 USD
Service Specialist/Supervisor	$170.00 USD
Controls Specialist	$195.00 USD
Consulting Engineer	$220.00 USD
Fabricator, Trades, Millwright	$ 85.00 USD
E & I Technician	$125.00 USD

OVERTIME CHARGES

All hourly rates will be adjusted as follows for overtime:

Over 8 hours/day and first 12 hours on Saturday:	Rate x 1.5
Sundays, holidays, and hours over 12 hours/day (any day):	Rate x 2.0

STANDBY TIME

Standby time will be billed at applicable standard rates shown above.

TRAVEL TIME

Time spent traveling to and from job site will be charged at appropriate standard or overtime rates shown above.

CALL-OUT

Call-Outs (Service calls initiated outside 7:30 am – 4:00 pm, M-F) have a minimum labor charge of eight (8) hours.

TOOLING (DOES NOT INCLUDE LABOR)

Laser Alignment Equipment	$250.00/Day
Vibration Analyzer	$150.00/Day

TRAVEL, ROOM, BOARD AND PER DIEM/LIVING EXPENSES

Travel (Air, bus, taxi, etc.)	Actual cost + 15%
Room/Board	Actual cost + 15%
Per Diem	$75.00/day
Service Vehicle	$1.75/ mile
Rental Vehicle	Actual cost + 15%

START-UP SERVICE

(14) Day notice to schedule personnel for new equipment start-up is required.

Rates are subject to change without notice.

EXHIBIT A

GENERAL CONDITIONS

1.0 INDEPENDENT CONTRACTOR

Seller represents that it is fully experienced, properly qualified, registered, licensed, equipped, organized and financed to perform the Work under this Agreement. In performing the Work, Seller shall act as an independent contractor. No subcontractor, agent or employee of Seller shall be deemed to be the agent, representative or employee of Peoples Gas. Seller shall at all times be an independent contractor and shall have sole responsibility for and control over the details and means and methods of performing the Work subject to the provisions of this Agreement. Any employment matters regarding the payment of salaries, remunerations, benefits, social indemnifications, allowances and any other such employment benefits shall be Seller's sole responsibility.

2.0 COMMUNICATIONS

All notices, demands, requests, instructions, approvals, proposals and claims shall be in writing and shall be deemed to be validly given when delivered personally or by courier (provided proof of delivery is made available) or mailed by registered or certified mail (return receipt requested), postage prepaid, to the other party's representative at the address set forth in Exhibit B, Commercial Terms.

3.0 DRAWINGS, SPECIFICATIONS AND DOCUMENTATION

The Work shall be performed in accordance with the scope of work including, among other things, the drawings and specifications provided by Peoples Gas as part of this Agreement. In the event Seller discovers any conflict, error, omission or discrepancy in the drawings, specifications, or instructions furnished by Peoples Gas, Seller shall immediately report in writing such conflict, error, omission or discrepancy to Peoples Gas to enable Peoples Gas to make a determination of the appropriate action to take. Seller shall not deviate from the specifications, drawings or instructions furnished by Peoples Gas without prior written approval from Peoples Gas. Any provision in the scope of work, drawings and/or specifications requiring Seller to submit drawings and/or other documents for "Review", "Comment", "Approval", "Acceptance", "Authorization to Proceed", or any combinations of such words or words of like import shall mean, unless stated otherwise, that Seller shall submit such drawings and/or other documents and obtain resolution of any comments before performing any Work described in such drawings and/or other documents. Peoples Gas's review shall not mean that a complete check has or will be performed. Any such approval or authorization to proceed shall not relieve Seller from full compliance with the drawings and specifications and other requirements of this Agreement.

4.0 CONFIDENTIAL INFORMATION

4.1 Confidential information provided by one party ("Disclosing Party") to the other party ("Receiving Party") shall be held in confidence and not divulged to third parties, without the prior written consent of the Disclosing Party unless (i) the information is known to the Receiving Party prior to obtaining the same from the Disclosing Party; (ii) the information is, at the time of disclosure by the Disclosing Party, then in the public domain; or (iii) the information is obtained by the Receiving Party from a third party who did not receive the same directly or indirectly from the Disclosing Party, and such third party has no obligation of secrecy with respect thereto.

4.2 Notwithstanding any proprietary legends or copyright notices to the contrary, Peoples Gas may copy or reproduce confidential information furnished by Seller in connection with this Agreement and distribute such confidential information to third parties for the limited purposes of designing, constructing, operating, maintaining or licensing Peoples Gas's facilities. Seller is responsible for obtaining necessary permission and releases from any third parties placing proprietary rights or copyrights on such confidential information and shall, at its own expense, indemnify, hold harmless and defend Peoples Gas against any and all claims, suits or proceedings, costs and expenses (including attorneys' fees) based upon a claim, whether rightful, or otherwise that a proprietary right or copyright has been infringed by copying, reproduction, distribution or use by Peoples Gas.

5.0 COMPLIANCE

Seller warrants that all Equipment shall have been produced, sold, delivered and furnished in strict compliance with all applicable laws and regulations to which the Equipment are subject. Seller shall execute and deliver to Peoples Gas any documents as may be required to effect or to evidence such compliance. All laws and regulations required to be incorporated in agreements such as this one are hereby incorporated herein by reference. Seller hereby agrees to indemnify, defend and hold Peoples Gas harmless from and against any and all claims, legal actions, final judgments, reasonable attorneys' fees, civil fines and any other losses which any of them may incur as a result of the sale or delivery to Peoples Gas hereunder of Equipment which does not meet all requirements of such laws and regulations.

6.0 CONTROL OF PEOPLES GAS-FURNISHED MATERIALS

6.1 If this Agreement requires Seller to take possession of Peoples Gas equipment to be removed from Peoples Gas property for the purpose of inspection, maintenance or repair, upon taking possession of the equipment Seller shall be solely responsible and shall bear all risks for damage or loss thereto until such time Seller returns the equipment to Peoples Gas. Title to the equipment shall remain with Peoples Gas.

6.2 If this Agreement requires Seller to take possession of and use Peoples Gas-furnished materials and equipment, title to all such materials and equipment ("Peoples Gas-Furnished Materials") shall remain with Peoples Gas. All Peoples Gas-Furnished Materials shall be received and unloaded by Seller and shall be counted, checked and inspected by Seller for compliance with the requirements of this Agreement. Seller shall carefully note any quantity deficiency or visible damage to Peoples Gas-Furnished Materials prior to Seller's acceptance of delivery. The delivery and Seller's receipt and acceptance of all Peoples Gas-Furnished Materials shall be recorded in writing, and a copy of such record shall be provided to Peoples Gas. After Seller has accepted delivery of Peoples Gas-Furnished Materials, the full care, custody and control of same shall be the sole responsibility of Seller who shall bear all risks for damage or loss thereto until such time Peoples Gas-Furnished Material is returned to Peoples Gas in the manner specified.

6.3 Seller shall segregate and clearly mark Peoples Gas-Furnished Material to show Peoples Gas's ownership and shall do all things necessary to preserve Peoples Gas's title thereto, free and clear of all encumbrances. Peoples Gas shall have the right to enter Seller's premises and inspect any and all Peoples Gas-Furnished Material. Should Seller fail to perform the duties imposed upon it by this Section, or should Peoples Gas at any time have reason to believe that its title to, or right to the possession of, any Peoples Gas-Furnished Material is threatened, Peoples Gas shall have the right to enter upon Seller's premises and remove any and all such material. Upon completion or termination of this Agreement, Seller shall segregate and collect in one location all Peoples Gas-Furnished Material and shall dispose of the same as Peoples Gas may direct.

6.4 Seller shall, at its own expense, maintain Peoples Gas-Furnished Material so that the same will remain suitable for the use contemplated hereby and, at the time required by this Agreement, be returned to Peoples Gas in as good condition as when received, except for reasonable wear and tear or consumption of materials necessarily resulting from their use.

7.0 QUALITY STANDARDS

7.1 Seller shall ensure that the Equipment complies with the standards of quality specified by this Agreement or the applicable industry standards if no requirement is specified. Peoples Gas's quality surveillance representative shall be afforded access during working hours to plants of Seller in order to monitor and audit compliance with quality requirements. Unless otherwise provided in this Agreement, Peoples Gas shall have the right to inspect, examine, and test the Equipment which right shall extend through the manufacturing process, the time of shipment and a reasonable time after arrival at the final destination. Peoples Gas's failure to monitor or audit compliance with quality requirements, or to

inspect, examine or test the Equipment, or to object to defects therein at the time Peoples Gas monitors or audits the quality requirements or inspects, examines or tests the Equipment, shall not relieve Seller of its responsibilities under this Agreement or be deemed to be a waiver of Peoples Gas's rights to subsequently reject defective Equipment and shall in no way affect Seller's obligations to perform the Work hereunder in accordance with the quality assurance requirements of this Agreement. Seller's failure to adhere to the standards of quality required under this Agreement shall be deemed to be reasonable grounds for insecurity in which event Peoples Gas may demand in writing that Seller provide adequate assurances of Seller's ability to meet said standards.

7.2 The Equipment shall not be deemed accepted until finally inspected and accepted by Peoples Gas's representative in writing at the job site. The making or failure to make an inspection, examination or test of, or payment for, or acceptance of the Equipment shall in no way relieve the Seller from its obligation to conform to all of the requirements of this Agreement and shall in no way impair Peoples Gas's right to reject or revoke acceptance of nonconforming Equipment, or to avail itself of any other remedies to which Peoples Gas may be entitled, notwithstanding Peoples Gas's knowledge of the nonconformity, its substantiality or the ease of its discovery.

7.3 Seller shall inspect all materials, supplies and equipment which are to be incorporated into the Equipment. In addition, Seller shall conduct a continuous program of quality control throughout the execution of the Work under this Agreement. Seller's quality control program and inspection procedures for the foregoing in performance of the Work hereunder shall be in writing and made available to Peoples Gas for review. The quality control program shall be in sufficient detail to delineate those items to be inspected and the manner in which they are to be inspected, and shall adequately describe all engineering, manufacturing and fabrication quality control activities contemplated, including provisions for adequate documentation of Seller's performance of such quality control and inspection. The quality control program shall also include Seller's vendor surveillance plans describing evaluation and monitoring of the quality assurance programs of its vendors and subsuppliers. Peoples Gas's review and approval of Seller's quality control program shall not relieve Seller from full compliance with the requirements of this Agreement.

7.4 Seller shall, during the course of performance of the Work hereunder, make or cause to be made all tests required to be made by Seller under this Agreement. To the extent requested by Peoples Gas, Seller shall furnish, without additional compensation, all facilities, labor and material reasonably needed for performing inspections and tests required to be performed by Seller under this Agreement. Seller shall furnish Peoples Gas documentation reasonably satisfactory to Peoples Gas of the results of all inspections and tests. Seller shall give Peoples Gas its best estimate of any witnessed test date ten (10) business days' before any tests are to be made by Seller in order that Peoples Gas may witness such tests. Peoples Gas shall be given a second notice not less than seventy-two (72) hours prior to such tests being made. Witness points are defined as predetermined points during fabrication when equipment may be inspected or witnessed for quality assurance requirements and other requirements of the Agreement. Hold points are defined as predetermined points mutually agreed to during fabrication when equipment must be inspected by Peoples Gas prior to continuing fabrication, manufacturing, or releasing for shipment. In the event that Peoples Gas fails to perform a hold point inspection or witness a hold point test (after being provided notice as set forth above) within two (2) calendar days after the scheduled test or inspection, Seller shall be released to continue with fabrication, manufacturing or shipment.

8.0 EXPEDITING

The Equipment, including all warranty work, shall be subject to expediting as mutually agreed by Peoples Gas and Seller. Peoples Gas's representatives shall be afforded access during working hours to Seller's plants to expedite Seller, and Seller agrees to procure a similar right for Peoples Gas for expediting purposes with respect to Seller's suppliers. As required by Peoples Gas, Seller shall supply factory locations, names of principal contacts, supply schedules, progress reports and unpriced copies of Seller's purchase orders and subcontracts for Peoples Gas's use in expediting. Seller shall notify Peoples Gas in writing of any actual or anticipated delays immediately upon discovery. Such notice shall

include an estimated period of delay, cause, and corrective actions being taken. Slippage in Seller's schedule may be deemed to be reasonable grounds for insecurity in which event Peoples Gas may demand in writing that Seller provide adequate assurances that Seller will perform on time.

9.0 DELIVERY

Timely performance and delivery in accordance with the schedule herein are important. Seller shall commence performance upon its acceptance and execution of this Agreement and shall deliver engineering submittals, drawings, samples, other similar documents and materials, and the Equipment in accordance with the Delivery Schedule. Unless otherwise provided herein, Seller shall be responsible for proper packaging, loading, and tying down in a manner sufficient to prevent damage during transportation. Each shipment must include packing list showing shippers' names, quantity and description of contents, and Agreement number of Peoples Gas.

10.0 TITLE AND RISK OF LOSS

Seller warrants and covenants that title to the Equipment furnished by Seller under this Agreement shall be good and marketable and shall pass to Peoples Gas free and clear of all liens, claims, security interests or encumbrances upon payment therefor or upon delivery, whichever occurs first. Notwithstanding the foregoing, Seller shall have care, custody and control of and shall be responsible for and shall bear any and all risk of loss or damage to the products until delivery thereof to the delivery destination set forth in this Agreement. Upon such delivery, Seller shall cease to bear the risk of loss or damage; provided, however, that any loss or damage, whenever occurring, that results from Seller's nonconforming packaging or crating shall be borne by Seller. Seller further warrants that materials or equipment provided hereunder shall not have been acquired by Seller pursuant to an agreement under which an interest therein or an encumbrance thereon is retained by Seller or any third party.

11.0 HAZARDOUS AND TOXIC SUBSTANCES DISCLOSURE REQUIREMENTS

In the performance of this Agreement, Seller shall comply with all applicable laws, rules, requirements, and ordinances including, but not limited to, those relating to environmental law, toxic or hazardous materials, occupational health and safety. If this Agreement calls for the transfer to Peoples Gas by Seller of any chemical substance or mixture, or any material which may generate or release a chemical substance or any hazardous agent, Seller shall provide Peoples Gas, before or with said transfer, a Safety Data Sheet (Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200) and label that are current, accurate and complete, which include but are not limited to a statement of product hazards and precautions for safe use.

12.0 WARRANTIES

Seller warrants that the Equipment shall be free from liens or other encumbrances, and shall be free from defects in design, material, workmanship, and title, and shall conform in all respects to the terms of this Agreement and to the applicable drawings issued for manufacture, and shall be new and shall conform to the quality standard of the industry, if no quality is specified. Seller further warrants that all services hereunder shall be rendered in a good and workmanlike manner by skilled personnel for a period of six (6) months from the date of performance. If, any time prior to one (1) year from initial operation or twenty-four (24) months from the date of Seller's written notice of intent to ship to Buyer assuming equipment preservation procedures are followed or at any time with respect to liens, title or latent defects, it appears that the Equipment, or any part thereof, do not conform to these warranties, and Peoples Gas so notifies Seller within the warranty period, Seller shall promptly correct such nonconformity; failing which and after written notice to Seller, Peoples Gas may reject or revoke acceptance, and cover by making any reasonable purchase of Equipment in substitution for those rejected and Seller will be liable to Peoples Gas for any excess costs for such substituted Equipment; or Peoples Gas may proceed to correct Seller's nonconforming Work by the most expeditious means available, and Seller will be liable to Peoples Gas for all direct and reasonable costs for such correction;

13.0 CHANGES

13.1 Peoples Gas, through its authorized representative, may at any time direct, in writing, changes, including but not limited to changes in any one or more of the following: (1) drawings or specifications; (2) additions to or deletions from quantities ordered; (3) delivery schedule; (4) method of shipment or packing; (5) place of delivery. Seller shall proceed with such changes after an equitable adjustment has been agreed to in writing by both Seller and peoples Gas. If any such change causes an increase or decrease in the cost of or timing required to provide the Equipment, an equitable adjustment may be made in the price or delivery schedule, or both, and this Agreement shall be modified by written amendments or revisions. Any request by Seller for adjustment under this Section paragraph 13.1 must be asserted within thirty (30) days from the date of receipt by Seller of the notification of change.

13.2 If this Agreement requires Peoples Gas to review and comment on Seller's technical documents, Seller shall submit, within thirty (30) days from the date of Seller's receipt of such comments, any request for adjustment which would result from implementation of Peoples Gas's comments. No adjustment will be made hereunder unless Peoples Gas, through its authorized representative, confirms the change in writing.

14.0 DISPUTES

Any controversy, dispute or claim between Seller and Peoples Gas that cannot be resolved at the project level shall initially be submitted, on five (5) days written notice, to be resolved during a meeting to be held between Seller's management and Peoples Gas's Director or General Manager having functional responsibility over the Work under this Agreement. If the matter is not resolved at such meeting, or if such meeting does not occur, either party may, within ten (10) business days after the date of the aforesaid written notice, present the matter to the senior management of Seller and Peoples Gas at a meeting for resolution. If the matter is not resolved within twenty (20) business days after such meeting of senior management, or if such meeting is not held within thirty (30) days of the aforesaid written notice, either party may pursue its available legal or equitable remedies. All time periods contained herein may be extended by the written consent of both parties.

15.0 SUSPENSION

Notwithstanding any other provisions of this Agreement, Peoples Gas may at any time, and from time to time, suspend further performance of all or any portion of the Work under this Agreement or extend the time for such performance, upon written notice of such suspension or extension. Upon receiving any such notice of suspension, Seller shall promptly suspend further performance of the Work hereunder to the extent specified, and during the period of such suspension shall properly care for and protect all work in progress and materials, supplies, and equipment Seller has on hand for performance of the Work hereunder. Peoples Gas may at any time withdraw the suspension of performance of the Work as to all or part of the suspended Work under this Agreement by written notice to Seller specifying the effective date and scope of withdrawal, and Seller shall resume diligent performance of the Work under this Agreement for which the suspension is withdrawn on the specified effective date of withdrawal. In the event of such suspension or extension, Seller shall be entitled to reimbursement for additional costs reasonably and necessarily incurred by Seller in effectuating such suspension or extension period, to the extent that such additional costs are actually incurred and documented to the reasonable satisfaction of Peoples Gas, only if claimed in writing within thirty (30) days after resumption of performance.

16.0 TERMINATION

16.1 Peoples Gas shall have the right at any time, with or without cause, to terminate further performance of the Work under this Agreement or any portion thereof by written notice to Seller specifying the date of termination. On the date of such termination stated in said notice, Seller shall discontinue performance of the Work under this Agreement so terminated; place no further orders or enter into any subcontracts for materials, equipment, supplies or services other than as may be necessary for the completion of Work under this Agreement not terminated; and shall preserve and protect the Work

hereunder. Seller shall assign to Peoples Gas in form and substance satisfactory to Peoples Gas such of its subcontracts, purchase orders and other agreements as are designated by Peoples Gas, or shall take such other action relative to such subcontracts, purchase orders and other agreements as may be directed by Peoples Gas. Seller shall deliver to Peoples Gas all documents and all property required to be delivered to Peoples Gas under this Agreement and transfer title to same to the extent not already transferred.

16.2 If the termination is for the convenience of Peoples Gas, Seller shall recover from Peoples Gas as complete and full settlement for such termination: (i) all amounts due and not previously paid to Seller for Equipment completed and all burdened labor expended in the performance of the Agreement in accordance with this Agreement prior to Seller's receipt of such notice of termination and for Work thereafter completed as specified in such notice; (ii) a reasonable amount for Work in progress (provided that no charges shall be recovered by Seller with respect to any goods that are Seller's standard stock); (iii) reasonable costs of settling and paying claims arising out of the cancelled orders; and (iv) a reasonable profit of fifteen (15) percent for costs incurred in the performance of the Work terminated minus the net salvage value of any materials and equipment purchased by Seller to be used in the Goods after subtracting the Seller's reasonable costs to salvage such materials and equipment. In no event shall Seller be entitled to anticipated or prospective profits for Work not performed, any damages because of such termination for convenience or an aggregate amount in excess of the Purchase Price (as reduced by the amount of payments otherwise made and as further reduced by the Purchase Price of Work not terminated).

16.3 If the termination is due to Seller's default in performance of any of its obligations under this Agreement including (1) failure to make delivery of the Equipment or to perform within the time specified herein or any extension thereof, or (2) delivery of nonconforming Equipment, or (3) failure to provide adequate assurance of Seller's ability to meet the quality standards or the delivery date(s) of this Agreement, or (4) failure to perform any of the other provisions of this Agreement in accordance with its terms or so fails to make progress as to endanger performance of this Agreement, or (5) Seller's insolvency or filing or has filed against it a petition for bankruptcy, reorganization, composition or compromise for protection of creditors under applicable law, and Seller fails to immediately correct such default (if immediate correction is not possible, the failure to commence and diligently continue effective action to correct such default) within ten (10) calendar days following written notice thereof from Peoples Gas, Peoples Gas may, at its option, either (i) engage another person to complete the Work under this Agreement (upon such terms and in such manner as Peoples Gas may deem appropriate) or Peoples Gas may complete the Work hereunder itself and, if the cost of completing the Work under this Agreement, including all of Peoples Gas's costs, exceeds the unpaid portion of the Purchase Price, then Seller shall pay the difference to Peoples Gas, or (ii) procure, upon such terms and in such manner as Peoples Gas may deem appropriate, Equipment similar to that so terminated and Seller shall pay to Peoples Gas any additional costs for such similar Equipment; provided, that Seller shall continue the performance of this Agreement to the extent not terminated under the provisions of this Section. Seller agrees to assist Peoples Gas in the event that Peoples Gas elects to utilize the procurement option set forth in subsection (ii) above, by cooperation in the transfer of information, in the disposition of Work in progress or residual material, and in the performance of other reasonable requests made by Peoples Gas.

16.4 If this Agreement is terminated for default and it is subsequently determined for any reason that Seller was not in default under the provisions of this Clause 16.0, or that the default was excusable under the provisions of this Agreement, the rights and obligations of the parties shall be the same as if the termination had been made for Peoples Gas's convenience.

17.0 PATENTS

Seller agrees to perform the Work so that the subsequent use of the Equipment shall not infringe upon or misappropriate any patented or unpatented inventions, copyrights (both statutory and non-statutory), trade secrets, proprietary rights, know-how or other intellectual property ("Intellectual Property Rights") under the laws of the United States, any foreign government, or otherwise. Seller further agrees to identify and promptly report to Peoples Gas any Intellectual Property Rights that may be required for use of the Equipment.

17.1 Seller shall indemnify Peoples Gas, its parent company, and the subsidiaries and affiliates of each, and all of their respective directors, officers, employees, agents, servants, successors, and assigns (collectively, the "Indemnitees") and shall hold harmless the Indemnitees from any and all claims, demands, losses, liabilities, damages, judgments, royalties, interest and/or penalties, costs and expenses (including attorney's fees), based upon or arising from an actual or alleged infringement or misappropriation of any Intellectual Property Rights arising out of the use of the Work or Equipment. Seller shall undertake the defense of any claim, demand or action arising from such actual or alleged infringement or misappropriation of any Intellectual Property Rights.

17.2 Without in any way limiting Seller's obligations above, if the use of the Equipment or the Work is enjoined in whole or in part, as a result of a suit based upon any such claims of infringement, or misappropriation, Seller shall promptly inform Peoples Gas of the corrective action it will take, which such action shall be to, at Seller's sole expense (i) negotiate a license or other agreement with the claimant so that the item or component is no longer subject to such injunction or (ii) modify such item or component suitably or substitute a suitable item or component therefor (subject to the technical approval of Peoples Gas), which modified or substituted item or component is not subject to such injunction. If the remedy is to modify or substitute an item or component, Peoples Gas agrees to make the Work or Equipment available to Seller to perform the corrective action in a manner which will not interfere with Peoples Gas's ability to operate its system to serve its customers. In the event that neither of the foregoing alternatives is suitably accomplished by Seller, Seller shall be liable to Peoples Gas for any and all of Peoples Gas's additional costs and damages incurred as a result of such injunction.

18.0 INDEMNITY

Each party (as "Indemnifying Party") shall indemnify and hold harmless the other party and its managers, officers, directors, employees, agents, affiliates, successors, and permitted assigns (collectively, the "Indemnified Party") against any and all losses, damages, liabilities, deficiencies, claims, actions, judgments, settlements, interest, awards, penalties, fines, costs, or expenses of whatever kind, including professional fees and reasonable attorneys' fees, that are incurred by Indemnified Party (collectively, "Losses"), arising out of any third-party claim alleging: (a) material breach or non-fulfillment of any material representation, warranty, or covenant under this Agreement by Indemnifying Party; (b) any negligent or more culpable act or omission of Indemnifying Party (including any reckless or willful misconduct) in connection with the performance of its obligations under this Agreement; or (c) any bodily injury, death of any person, or damage to real or tangible personal property caused by the negligent or more culpable acts or omissions of Indemnifying Party (including any reckless or willful misconduct).

19.0 INSURANCE

19.1 If this Agreement requires Seller to perform Work on site, including Technical Field Assistance, equipment inspection or maintenance, or if the Work involves the hauling and/or rigging of Peoples Gas property valued in excess of $300,000, Seller shall, at its sole expense, maintain in effect, at all times during the performance of such on-site Work, insurance coverage with limits not less than those set forth below with insurers having a A.M. Best rating of "A-IX" or better. Seller shall deliver to Peoples Gas no later than thirty (30) calendar days after acceptance of this Agreement but in any event prior to Seller commencing such on-site Work or entering the job site, certificates of insurance as evidence that policies providing such coverage and limits of insurance are in full force and effect.

Certificates shall be issued on an ACORD form or in a form acceptable to Peoples Gas. Seller shall provide that not less than thirty (30) calendar days advance written notice will be given to Peoples Gas prior to cancellation, termination or material alternation of said policies of insurance. Certificates shall also identify on their face the project name and the applicable Agreement number.

19.2 Seller shall maintain Worker's Compensation insurance (including coverage for Occupational Disease) as required by all applicable laws and regulations. If the Work involves exposure of injury to Seller's employees under the U.S. Longshoremen's and Harbor Worker's Compensation Act, the Jones Act or under laws, regulations or statutes applicable to maritime employees, Seller shall maintain coverage for such injuries or claims. Seller shall maintain Employer's Liability insurance of not less than $1,000,000 each accident.

19.3 Seller shall maintain General Liability insurance covering all operations by or on behalf of Seller providing insurance for bodily injury liability and property damage liability with limits of liability of not less than $2,000,000.00 each occurrence and $2,000,000.00 annual aggregate. The General Liability insurance shall include coverage for: (i) Premises and Operations; (ii) Products and Completed Operations; (iii) Contractual Liability insuring the obligations assumed by Seller in this Purchase Order; (iv) Broad Form Property Damage (including Completed Operations); (v) Explosion, Collapse and Underground Hazards; and (vi) Personal Injury Liability. The General Liability insurance shall be the Occurrence Coverage Form. The required limits may be satisfied by a combination of primary policy and an excess or umbrella policy.

19.4 Seller shall maintain Automobile Liability insurance including coverage for all owned, hired and non-owned automobiles. The Automobile Liability insurance shall also include coverage for Automobile Contractual Coverage. The combined single limit for bodily injury and property damage liability shall be not less than $2,000,000 for any one accident or loss. The required limits may be satisfied by a combination of a primary policy and an excess or umbrella policy.

19.5 If the Work involves the hauling and/or rigging of property valued in excess of $300,000, Seller shall also maintain "All Risk" Transit Insurance, or "All Risk" Cargo Insurance, or such similar form of insurance that will insure against physical loss or damage to the property being transported, moved or handled by Seller pursuant to the terms of this Agreement. Such insurance shall provide a limit of not less than the replacement cost of the property being lifted or moved, whichever is greater.

19.6 Peoples Gas, its officers, directors and employees shall be named as an Additional Insured in all of the foregoing policies (except for any worker's compensation policy) with respect to liability arising out of the Work being performed under this Agreement. Such insurance shall be primary coverage afforded the Additional Insured and shall contain a cross-liability or severability of interest clause. Seller hereby waives and shall cause its subcontractors and suppliers and its and their insurers to waive all rights of subrogation against Peoples Gas, its officers, directors and employees in the event of any covered loss under the policies described above or under any policy maintained by Seller covering Seller's tools and equipment used for the Technical Field Assistance.

19.7 The requirements contained herein as to types and limits, as well as Peoples Gas's approval of insurance coverage to be maintained by Seller, are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by Seller under this Agreement. Seller shall be solely responsible for any unpaid premium or breach of warranty by Seller. Seller shall permit any authorized representative of Peoples Gas to examine Seller's original insurance policies, should Peoples Gas so request. Should Seller at any time neglect or refuse to provide the insurance required herein, or should such insurance be canceled, without waiving any other rights or remedies which Peoples Gas may have under the circumstances, Peoples Gas shall have the right to purchase such insurance and the cost thereof shall be deducted from monies due Seller. Failure to provide insurance in accordance with this Clause shall constitute a material breach of this Agreement.

19.8 Original of Certificates of Insurance which clearly evidence that Seller's insurance policies contain the minimum limits of coverage and special provisions prescribed in this clause, and notices of

cancellation, termination and alteration of such policies shall be delivered to Peoples Gas Company, Contracts, 702 N. Franklin Street, Tampa, Florida 33602.

20.0 PRICE AND PAYMENT

20.1 The price set forth herein, unless otherwise expressly stated, shall exclude all taxes and duties of any kind which either party is required to pay with respect to the sale of Equipment covered by this Agreement, but shall include all charges and expenses in connection with packaging of Equipment and its carriage to the place of delivery to Peoples Gas unless otherwise excluded. Invoices shall be based upon the prices described in Exhibit B, Commercial Terms and shall be accompanied by progress reports and other documentation as required by this Agreement or otherwise requested by Peoples Gas. Invoices will be payable, less any disallowances, deductions and retainage provided for in this Agreement, thirty (30) calendar days from receipt of a proper invoice.

20.2 Peoples Gas shall have the right to withhold, without penalty or interest, such amounts as are in dispute after written notice to Seller and such amounts Peoples Gas deems necessary to protect it from loss, cost or damage due to Seller's default of any requirement of this Agreement.

20.3 Seller shall maintain and preserve books and records sufficient to document the performance of its obligations hereunder and any charges under this Agreement that are based on Seller's actual costs due or which may become due from Peoples Gas or for evaluating the reasonableness of proposed price adjustment requests. Peoples Gas shall have the right to access, inspect and audit such books and records at any reasonable time, upon reasonable notice to Seller. Notwithstanding the foregoing, Seller shall not be required to keep records or provide access to those of its costs covered by a fee, fixed rates, or of costs which are expressed in terms of percentages of other costs.

21.0 TAXES, DUTIES AND FEES

Chapter 212.08(5)(c), Florida Statutes, exempts machinery and equipment used in the production of electrical or steam energy resulting from the burning of boiler fuels other than residual oil from Florida State Sales and Use Taxes. Peoples Gas shall identify in Exhibit B, Commercial Terms all such machinery and equipment considered to be exempt from Florida State Sales and Use Taxes and provide Seller with an affidavit with respect thereto. In the event such machinery and equipment is not exempt from Florida State Sales or Use Taxes, Seller shall add such tax to its invoice and shall collect such taxes from Peoples Gas and pay such taxes to the State of Florida; provided however, that, if Seller is not registered in the State of Florida and is not required to collect Florida State Sales or Use Taxes, no such amount shall show on the invoice and Peoples Gas shall pay such taxes directly to the State of Florida.

22.0 RELEASE AGAINST LIENS AND CLAIMS

Seller shall at all times promptly pay for all services, materials, equipment and labor used or furnished by Seller in the performance of the Work. Subject to payment by Peoples Gas to Seller of all amounts due and not in dispute, Seller shall, at its expense keep all property belonging to Peoples Gas free and clear of any and all liens and rights of lien arising out of services, labor, equipment or materials furnished by Seller or its employees, materialmen or subcontractors in the performance of the Work hereunder. If requested by Peoples Gas, Seller shall submit satisfactory evidence of payment and releases of all claims and liens prior to being entitled to payment hereunder. If Seller fails to release and discharge any claim of lien against the property of Peoples Gas arising out of performance of the Work under this Agreement within ten (10) working days after receipt of written notice from Peoples Gas to remove such claim of lien, Peoples Gas may, at its option, discharge or release the claim of lien or otherwise deal with the lien claimant, and Seller shall pay Peoples Gas any and all costs and expenses of Peoples Gas in so doing, including reasonable attorneys' fees incurred by Peoples Gas, or, alternatively, Peoples Gas may, at its option, deduct such costs and fees from any amounts due Seller.

23.0 EXCUSABLE DELAYS

Neither party shall be liable for any "Excusable Delay", which shall mean a delay in performance due to any of the following: proposed delays to the ready to ship date or changes in delivery proposed by Peoples Gas, acts of God, acts of civil or military authority, explosions or fires, strikes or other labor disturbances not involving Seller's employees at the location where the Work under this Agreement is being performed, epidemics, war, riot, actions or inactions of third parties who are not subcontractors or suppliers of such party, or other events similar to the foregoing that are beyond such party's reasonable control and without such party's fault or negligence, but only to the extent any of the foregoing directly affect such party's ability to perform its obligations hereunder within the time allotted and are beyond such party's reasonable control and ability to prevent, avoid or mitigate. As soon as practicable after a party hereto anticipates or experiences a delay in its performance hereunder (the "Affected Party"), the Affected Party shall give written notice to the other party of the event and the details of the event giving rise to the delay. The Affected Party shall have the duty to expeditiously propose a solution to mitigate or resolve any delay or the effects thereof. In the event of an Excusable Delay, all times of performance for the Affected Party's obligations hereunder shall be extended by a period equal to the actual time of performance lost as a result of such delay, but no additional compensation shall be payable as a result of such Excusable Delay. In the event that a delay extends beyond thirty (30) days, the Parties hereto shall be required to use good faith, reasonable efforts to negotiate a reasonable resolution or plan to mitigate or resolve the effects of the delay that is mutually acceptable to both parties.

24.0 ASSIGNMENT

Seller agrees that it will not sell, assign, transfer or sublet this Agreement or any part thereof or interest therein, either by power of attorney or otherwise, without the prior written consent of Peoples Gas. Any such sale, assignment, transfer or subletting without such consent of Peoples Gas shall be null and void. Peoples Gas may, at its sole discretion and without consent of Seller, assign, sell, transfer or sublet this Agreement or any part thereof to any other person or entity. No assignment shall release either party from its obligations and liabilities under this Agreement.

25.0 WAIVER

Failure of either party to enforce at any time, or for any period of time, one or more of the terms or conditions of this Agreement shall not be a waiver of such term or condition or of such party's rights thereafter to enforce each and every term and condition of this Agreement. Waiver by either party of any right under this Agreement shall not be deemed a waiver by such party of any other right hereunder.

26.0 GOVERNING LAW AND VENUE; JURY TRIAL WAIVER

The validity, performance and all matters relating to the interpretation and effect of this Agreement shall be governed by the laws of the State of Florida, without regard to its conflicts of law principles. ALL ACTIONS ARISING OUT OF OR RELATING TO THIS AGREEMENT SHALL BE HEARD AND DETERMINED EXCLUSIVELY IN THE STATE COURTS OF FLORIDA SITTING IN HILLSBOROUGH COUNTY OR THE FEDERAL COURTS OF THE MIDDLE DISTRICT OF FLORIDA. Each party irrevocably submits to the exclusive jurisdiction of the courts of Florida in any action or proceeding arising out of or relating to this Agreement. Each party waives any objection to such jurisdiction on the grounds that it is an inconvenient forum or any similar grounds. SELLER AND PEOPLES GAS (BY ITS ACCEPTANCE HEREOF) HEREBY IRREVOCABLY WAIVE ANY AND ALL RIGHTS TO TRIAL BY JURY WITH RESPECT TO ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT.

27.0 ADVERTISING

Seller shall not, without Peoples Gas's prior written consent, (i) release any information pertaining to this Agreement, (ii) use the name of Peoples Gas on any public release or (iii) in any manner advertise or

publish the fact that the Seller has contracted to furnish materials or services to Peoples Gas or that Peoples Gas has agreed to purchase the same.

28.0 SEVERABILITY

The invalidity of one or more phrases, sentences, clauses, or sections contained in this Agreement shall not affect the validity of the remaining portion of this Agreement so long as the material purposes of this Agreement can be determined and effectuated.

29.0 SURVIVAL

Certain applicable provisions hereof including, without limitation, inspections, warranty, disputes, termination, indemnifications, and all other provisions of this Agreement that by their very nature survive final acceptance hereunder, shall survive termination, expiration or cancellation of this Agreement.

30.0 CAPTIONS

The captions and subheadings contained in this Agreement are for convenience and reference only and in no way define, describe, extend, or limit the scope or intent of this Agreement or the intent of any provision contained herein.

31.0 RIGHT TO OFFSET

Peoples Gas, without waiver or limitation of any rights or remedies it may have, shall be entitled to deduct from any monies due Seller under this Agreement (or any other agreement with Peoples Gas) any and all amounts owed by Seller to Peoples Gas.

32.0 AMENDMENTS

No amendment or modification of this Agreement shall be valid or binding upon the Parties unless such amendment or modification shall be in writing and duly executed by the parties hereto.

33.0 COUNTERPARTS

This Agreement may be executed by the parties in a number of identical counterparts, each of which for all purposes is deemed an original, and all of which constitute collectively one agreement. Documents may be signed and delivered with facsimile signatures, which shall be effective for all purposes in carrying out the terms of this Agreement.

34.0 LIMITATION OF REMEDY AND LIABILITY

Seller shall not be liable for damages caused by excused delays in performance. Peoples Gas agrees that in no event shall Seller's liability to Peoples Gas and/or its customers extend to include incidental, consequential or punitive damages. The term "consequential damages" shall include but not be limited to, loss of anticipated profits, loss of use, loss of revenue or profit and cost of capital. Seller's warranty and obligations hereunder do not extend or apply to: (1) Equipment which is functioning within Seller's published specification; (2) Equipment which is selected, designed or assembled in reliance upon information supplied by Peoples Gas that varies from the use or conditions represented or otherwise described by Peoples Gas; (3) Equipment installed or serviced by other than an authorized representative of Seller; (4) damages arising when the Equipment is combined or used with items not supplied by Seller; (5) failure to operate or maintain the Equipment according to the operator's manual; or (6) Equipment subjected to misuse, use for unforeseeable purposes, abuse or alteration. Notwithstanding any other provision hereof to the contrary, Seller's total, cumulative liability arising out of or related to the performance or non-performance of this Agreement shall be limited to the amount of the applicable Agreement price, and Peoples Gas shall hold harmless and indemnify Seller from and against all liability in excess of such limitation.

EXHIBIT C

SPECIFICATION FOR PURCHASING OF SKID MOUNTED RECIPROCATING COMPRESSOR UNITS

for

TECO Peoples Gas

BALDWIN COMPRESSOR STATION

Rev.	Date	Reason for Issuance	Prepared By	Checked By	Approved By
2	11/25/19	Updated for Purchase	John Skinner	John Mock	John Skinner
1	11/07/2019	Conformed for Purchase	John Mock	John Skinner	TJ Tajani
0	9/24/2019	Conformed for Purchase	Tyson Dabney	Alejandro Bernedo-Martinez	Alejandro Bernedo-Martinez
C	6/25/2019	Issued for Quotes	Arnold Eisenstein	Marcelo Rea	TJ Tajani
B	06/18/2019	Issued for Quotes	Arnold Eisenstein	Marcelo Rea	TJ Tajani
A	06/15/2019	Issued for Review	Arnold Eisenstein	Marcelo Rea	TJ Tajani

REVISION HISTORY

Rev.	Date	Revised By	Revision Description
B	06/18/2019	Marcelo Rea	Client and internal comments incorporated
C	06/25/2019	Marcelo Rea	Client additional comments
0	9/24/2019	Tyson Dabney	Updated with data from UE Compression Proposal
1	11/07/2019	John Mock	Updated with clarifications from Meeting of 10/29/2019 with TECO and UEC and UPI
2	11/25/2019	John Skinner	Client request to change page 32 vendor data delivery times, sec 2-9 note, and "Exhibit C" (UEC contract) to Title

TABLE OF CONTENTS

SECTION I - GENERAL REQUIREMENTS

SECTION II - DESIGN DATA AND UNIT DESCRIPTION

SECTION III - EQUIPMENT SYSTEM CHECK LIST

SECTION IV – SELLER INFORMATION

SECTION V – DESIGN SPECIFICATIONS

SECTION I - GENERAL REQUIREMENTS

1.0 SCOPE

This specification covers the design, fabrication, testing and inspection of high-speed skid mounted engine and separable compressor units.

2.0 CODES AND STANDARDS

High speed skid-mounted engines and separable compressor packages shall be designed, fabricated and tested in accordance with the latest approved edition, as applicable, of the following:

- 49 CFR Part 192
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- American Society of Mechanical Engineers (ASME) Section VIII, Division I
- American Society for Testing and Materials (ASTM)
- Manufacturer's Standardization Society (MSS)

3.0 START-UP SERVICES

Qualified start-up service personnel representing the Seller, shall be present at the field station site as necessary for check out and startup of the unit. ~~This should be quoted as rate based support, owner to advise seller when and how long support is required.~~

The service personnel will be responsible for all required erection supervision and checkout of all Seller furnished equipment, unit alignment and clearance checks, panel, control devices, field calibration, piping check, tubing check and related items necessary for startup and operation of the unit.

The Seller will provide all start-up assistance and instruction of TECO Peoples Gas personnel in general operation and maintenance.

4.0 FIELD ACCEPTANCE

All compressor units will be subjected to a "Field Acceptance Test" within one year from date of shipment. The Seller is invited to witness the Field Acceptance Test and will be notified two weeks prior to the test date. If deficiencies are found during the field acceptance test, the Seller shall make necessary corrections within 60 days. Upon completion of necessary corrections to allow the unit to meet Seller's guarantees, a retest of the unit may be made at the TECO Peoples Gas's option.

SECTION II - DESIGN DATA AND UNIT DESCRIPTION

1.0 TECO PEOPLES GAS SUPPLIED DESIGN DATA

1.1 Unit Configuration

Station Name Baldwin Compressor Station, Number of Units Required 2 (below operating and design conditions are per unit).

Engine Manufacturer Waukesha

Compressor Manufacturer Ariel

Isentropic Brake-Horsepower Required for Compression 1895 HP (Each)

Minimum Number Throws Per Unit 4, Location Baldwin, Florida

Number of Stages: Initial 1, Projected N/A

Type Driver: [X] Gas (Alternate), [ ] Electric Motor, [ ] Diesel

Service: Natural Gas Transmission

1.2 Design Point Conditions

Suction Pressure 500 psig Suction Temperature 75 °F

Discharge Pressure 1000 psig Flow Rate 35 MMSCFD/EA

Ambient Temperature 105 °F Elevation 100 Ft

Designed for pressurized stand by

1.3 Design Operating Range

Suction Pressure: 500 to 800 psig

Suction Temperature: 65 to 75 °F

Discharge Pressure: 1000 to _____ psig

Volume Range 20 to 62 MMCF/D

1.4 Projected Operating Conditions

Year	2025		
Suction Pressure	500 psig	_____ psig	_____ psig
Discharge Pressure	800 psig	_____ psig	_____ psig
Volume	62 MMCF/D	_____ MMCF/D	_____ MMCF/D

1.5 Gas Analysis

1.5.1 Lab Analysis

Mole Percent

H_2	0.0147	C_3H_8	1.0	Design Specific Gravity 0.6
He		iC_4H_{10}	0.30	Gross Heating Value (dry)
O_2		nC_4H_{10}	0.30	BTU/Ft^3
CO_2	0.0253	iC_5H_{12}		LHV BTU/Ft^3
N_2	0.05	nC_5H_{12}	0.20	H_2S Grains/100 scf
H_2S		C_6H_{14}	0.25	Mercaptan Grains/100 scf
CH_4	95	C_7H_{16}	0.25	Total Sulfur Grains/100 scf
C_2H_6	2.61	Total	100.00	

1.5.2 Content Other Than Gas

Comments on water, hydrocarbon, sand, salt, etc., obtained from well test or other available sources.

Pipeline Quality Natural Gas

1.6 Main Gas Piping Design Pressure and Temperature Rating

Design Pressure: Suction 1200 psig Discharge 1200 psig

Design Temperature: Suction 150°F Discharge 350 °F

Flange Rating: ANSI 600# RF

Corrosion Allowance: 0.0625 inches

1.7 Volume Bottle Design

[X] Based on Digital Pulsation Analysis [X] Primary Bottles only

[X] 49 CFR Part 192 [X] ASME Code Design, Stamped Not Needed

1.8 General Design Conditions

1.8.1 Station Elevation (feet)

100

1.8.2 Compressor Unloading

[X] As Required to Satisfy Design

[ ] Valve Yokes

[ ] Variable Volume Pockets

[X] Fixed Volume Clearance Pocket (one cylinder)

[X] Head End Valve Unloader for single acting capacity control

[X] Reduced RPM Operation, Range (RPM) 75%

1.8.3 [ ] Winterizing and Insulation Required per Section V

1.8.4 [ ] Special Engine Air Cleaner by TECO Peoples Gas

1.8.5 Unit Installation

[ ] Outside [X] Shed with Roof with Partial Drop Sides

[ ] Building, Unheated [ ] Building, Heated

1.8.6 [X] Electric Power Available for Auxiliaries

Volts	Amps	Phase	Hertz
TBD			

1.9 Fuel Gas

1.9.1 Available Fuel Gas

150 psig at 50 to 80 °F

1.9.2 Fuel Gas Analysis (If different from 1.5.1)

Mole Percent

H_2		C_3H_8		Specific Gravity	
He		ic_4H_{10}		Gross Heating Value (dry)	
O_2		nc_4H_{10}		BTU/Ft^3	
CO_2		ic_5H_{12}		LHV	BTU/Ft^3
N_2		nc_5H_{12}		H_2S	Grains/100 scf
H_2S		C_6H_{14}		Mercaptans	Grains/100 scf
CH_4		C_7H_{16}		Total Sulfur	Grains/100 scf
C_2H_6		Total			

1.10 Starting Air or Gas Supply

[X] Starting Air @ 100 to 150 psig

[ ] Starting Gas (Same as Fuel Gas) @ _____ psig

1.11 Emission Requirements

[ ] Lean Burn engines are required.

Allowed Maximum (gm/BHP-Hr)

NO_X 0.5

NO _____

NO_2 _____

CO _____

Total H.C. _____

Nonmethane H.C. _____

1.12 Torsion Analysis Requirements

To be Included by Seller

1.13 Noise Requirements

60 DBA @ 300 feet from unit. (Not Guaranteed)

Seller to supply Noise Solutions – Noise Impact Assessment and recommendations study.

1.14 Motor Specifications

[X] Induction [ ] Synchronous

[X] TEFC [ ] WP II [X] 1.15 Service Factor [ ] F-type Insulation

[ ] 1.0 Power Factor Temperature Rise: [X] 80 C [ ] 90 C

[ ] 900 RPM Motor Speed [ ] 1800 RPM Motor Speed

2.0 SELLER UNIT DESCRIPTION (BY SELLER)

2.1 Unit Dimensions and Weight *Estimates*

Total unit dimensions and weight, including skid, engine (or motor), compressor and cooler.

Width (feet): 15 , Length (feet): 33.5 , Height (feet) 13.5

Weight (lbs.): 110,000 shipped without concrete ,

2.2 Component Information

2.2.1 Cooler or fin fan

Manufacturer AXH Air Coolers , Model 132-2ZF

Width (feet) 14ft ,Length (feet) dwg , Height (feet) dwg

Maximum Fan Hp ***25HP (2 fans with (1) 25 HP motor per fan)*** .

2.2.2 Control Panel (Electronic)

Manufacturer Allen Bradley , Model Control Logix .

2.2.3 Starting Air/Gas Requirements. (Starting Air/Gas Supplied at 150 psig)

Starter Mfr. _____, Model _____

Required Flow: _____ SCFM at _____ psig Minimum

_____ SCFM at _____ psig Maximum

2.2.3 Scrubbers

	Suction	Interstage	Interstage
Type	Yes		
Mfr.			
Diameter	36 inch		
Height			
Liq. KO Cap.	99.9% of 8 micron		

2.2.4 Exhaust Silencer

Type Hospital grade , Mfr. EMIT or equivalent

35-40 dBA insertion loss

2.2.5 Ignition System (variable timing capability)

Manufacturer _____, Model _____.

2.2.6 Air/Fuel Ratio Control (Variable system)

Manufacturer _____, Model _____.

2.3 Engine Emission Level Data

The Seller shall provide the following emission quantities and guarantee that they will not be exceeded over the engine power range.

2.3.1 Seller Guarantees

NO_X	0.5	gm/BHP-HR
NO	_____	gm/BHP-HR
NO_2	_____	gm/BHP-HR
CO	_____	gm/BHP-HR
Total H.C.	_____	gm/BHP-HR
Nonmethane H.C.	_____	gm/BHP-HR

2.3.2 Engine parameters at above guaranteed emission rates.

Air/Fuel Ratio_____ Exhaust Mass Flow (lb/hr)___

Ignition Timing °BTDC_____ Air Manifold Pressure (psia)_

Max. Amb. Air Temp. (°F)___

Exhaust Temp. (°F)_____at Engine or Turbo Outlet

Max. Back Pressure (in-H2O) _____at Engine or Turbo Outlet

2.3.3 Description of Emission Control System

_____

_____

_____

~~2.4 Seller's Performance Guarantee~~

~~Typical performance metrics like engine fuel consumption, isentropic efficiency, thermal efficiencies are included in seller's proposal.~~

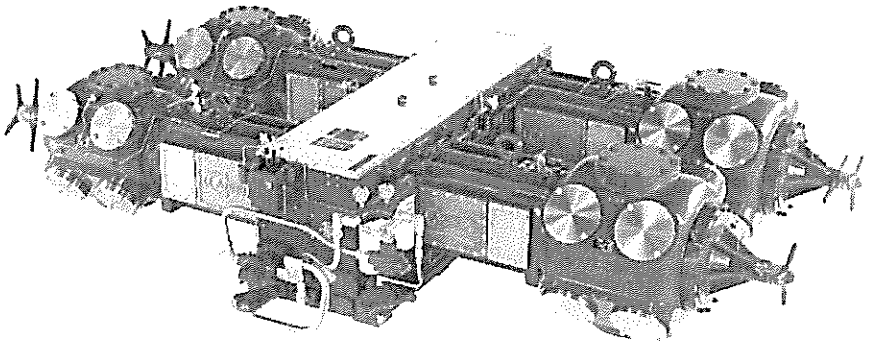
~~2.5 Engine and Compressor Data Sheet~~

~~Seller shall complete all applicable items on the sheet and submit with the quotation. The successful Seller shall revise and submit the sheet at the completion of the job with the unit job books.~~

3.0 ENGINE AND COMPRESSOR DATA SHEET (BY SELLER)

ARIEL CORPORATION
World Standard Compressors
35 Blackjack Road | Mount Vernon, OH 43050 | www.arielcorp.com

JGE/JGK/JGT



	JGE			JGK			JGT		
Number of Throws	2	4	6	2	4	6	2	4	6
Rated Power (BHP)	1,070	2,140	3,210	1,270	2,540	3,810	1,300	2,600	3,900
Rated Power (kW)	798	1,596	2,394	947	1,894	2,841	969	1,939	2,908
Stroke (in)		4.5			5.5			4.5	
Stroke (mm)		114			140			114	
Maximum RPM		1,500			1,200			1,500	
Piston Speed (FPM)		1,125			1,100			1,125	
Piston Speed (m/s)		5.72			5.59			5.72	
Total Rod Load (lbs)		60,000				74,000			
Total Rod Load (N)		266,893				329,168			
Rod Load Tension (lbs)		30,000				37,000			
Rod Load Tension (N)		133,447				164,584			
Rod Load Compression (lbs)		32,000				40,000			
Road Load Compression (N)		142,343				177,929			
Rod Diameter (in)					2.0				
Rod Diameter (mm)					51				
Crankshaft Centerline, from bottom (in)					17				
Crankshaft Centerline, from bottom (mm)					432				

for more information visit www.arielcorp.com

TECO PEOPLES GAS AN EMERA COMPANY	**Baldwin Compressor Station Specification for Purchasing of Skid Mounted Reciprocating Compressor Units**		UniversalPegasus INTERNATIONAL A Subsidiary of Huntington Ingalls Industries
Client Doc. Number	**Revision: 1**	**Date: 11/7/2019**	**UPI Doc. Number**
N/A			**24689-541-TSP-00001**

Waukesha

VHP - L7044GSI S5

Gas Compression

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	Customer Catalyst
DISPLACEMENT (in3):	7040	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	9.7:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F):	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	100
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	11
ENGINE DRY WEIGHT (lbs):	24250	LUBE OIL CAPACITY (gal):	100
AIR/FUEL RATIO SETTING:	0.38% CO	MAX. EXHAUST BACKPRESSURE (in. H2O):	20
ENGINE SOUND LEVEL (dBA):	102.7	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA):	98.9

SITE CONDITIONS:

FUEL:		ALTITUDE (ft):	100
FUEL PRESSURE RANGE (psig):	43 - 60	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,065.1	FUEL WKI:	94.8
FUEL LHV (BTU/ft3):	981.0		

SITE SPECIFIC TECHNICAL DATA

			MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 100 °F		
POWER RATING	**UNITS**			**100%**	**75%**	**50%**
CONTINUOUS ENGINE POWER	BHP		1900	1900	1425	950
OVERLOAD	% 2/24 hr		0	0	-	-
MECHANICAL EFFICIENCY (LHV)	%		35.3	35.3	34.6	32.6
CONTINUOUS POWER AT FLYWHEEL	BHP		1900	1900	1425	950
based on no auxiliary engine driven equipment						
AVAILABLE TURNDOWN SPEED RANGE	RPM		900 - 1200			
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr		7218	7218	7364	7802
FUEL CONSUMPTION (HHV)	BTU/BHP-hr		7984	7984	8146	8630
FUEL FLOW *based on fuel analysis LHV*	SCFM		233	233	178	126
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000		3759	3756	2956	2182
LUBE OIL (OC)	BTU/hr x 1000		469	469	435	397
INTERCOOLER (IC)	BTU/hr x 1000		683	683	382	154
EXHAUST	BTU/hr x 1000		3657	3657	2737	1880
RADIATION	BTU/hr x 1000		577	577	551	526
EMISSIONS (ENGINE OUT):						
NOx (NO + NO2)	g/bhp-hr		11.2	11.2	12.3	12.6
CO	g/bhp-hr		9.1	9.1	9.2	9.5
THC	g/bhp-hr		0.5	0.5	0.7	0.9
NMHC	g/bhp-hr		0.08	0.08	0.10	0.13
NM,NEHC (VOC)	g/bhp-hr		0.04	0.04	0.06	0.07
CO2	g/bhp-hr		442	442	451	478
CO2e	g/bhp-hr		453	453	466	497
CH2O	g/bhp-hr		0.050	0.050	0.050	0.050
CH4	g/bhp-hr		0.43	0.43	0.58	0.76
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM		2566	2566	1964	1358
EXHAUST GAS MASS FLOW	lb/hr		11932	11932	9130	6452
EXHAUST GAS FLOW *at exhaust temp, 14.6 psia*	ACFM		8328	8328	6265	4356
EXHAUST TEMPERATURE	°F		1110	1110	1064	1059

HEAT EXCHANGER SIZING[2]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000		4261
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000		1308

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS		
JACKET WATER PUMP MIN. DESIGN FLOW	GPM	450
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	16
AUX WATER PUMP MIN. DESIGN FLOW	GPM	79
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	36

SECTION III - EQUIPMENT SYSTEM CHECK LIST

1.0 FUEL GAS AND STARTING GAS CHECKLIST

	Include	Comments
Fuel gas connection at the cooler end of skid. Gas to be supplied at line pressure from station suction.	X	
Starting gas connection at cooler end of the skid with 2" minimum ANSI Class 150 flanged connection.	X	
First-cut and second-cut fuel gas regulators, steel body.	X	
First-cut and second-cut fuel gas relief valve, steel body.	X	
Fuel gas meter. (Yokogawa Coriolis)	X	
Fuel gas filter-separator system.	X	
Three-way fuel gas shutoff and vent valve, steel body, with air head.	X	
Engine fuel gas regulator and relief system, manufacturer's standard.	X	
Starting air quick opening steel body valve actuated from the panel.	X	
Starting air strainer, steel.	X	
Engine starting air motor(s) w/ lubricator(s).	X	
Instrument air supply with a dryer and shutoff valve from the fuel gas system.	N/A	
All gas regulator vents and pilot operated relief valve vents tubed with 3/8" stainless steel tubing to a point outside of the cooler flashing on units. Not inside the building.	X	

2.0 MAIN GAS SYSTEM

	Include	Inspect
Suction control Valve. Becker with T1 trim and positioner preferred	X	
Scrubbers designed and stamped in accordance with ASME Section VIII, latest edition. Maximum pressure drop 2 psi under all conditions shown in Section II. Scrubbers include items as follows.	X	
Suction scrubber, vertical vane type, capable of removing 99% of all particles over 5 microns over specified flow range.	X	
Interstage scrubber(s), vertical vane or stainless-steel mist pad type, capable of removing 99% of all particles over 5 microns over the specified flow range.	N/A	
Top vent connection, 3/4" NPS w/plug.	X	
Liquid level reflex gauge with safety and drain valves.	X	
Liquid level controller, internal float w/ quieting chamber.	X	
Automatic steel body dump valve (sized for specific liquids).	X	
Isolate automatic dump valve with two steel body valves and a check valve.	N/A	
Manual steel body drain valve.	N/A	
High liquid level engine shutdown but not combined with 2.1.5 above, internal float w/quieting chamber.	N/A	
Scrubber mounting to be on skid, to either end of the skid (i.e., not to the side where it might interfere with engine or compressor maintenance.)	X	

Freeze protection, if specified. Insulate and winterize per Section V. N/A

Any accoustic pulsation dampeners shall have full penetration welds, and shall be designed with ¾" nozzle and end pressure test taps, 1" temperature taps, 1" drains and vent taps, in accordance with:

[X] DOT (ASME B31.8) bottles using high yield fittings (Preferred), X

[ ] ASME Code Section VIII Div. 1, using saddles and pipe X

Spacers of 1/4" thick carbon steel plate, installed in each nozzle and the inlet or outlet of all pulsation bottles. Will be placed as required by pulsation study.

Compressor cylinders hydrostatically shall be hydro tested at 1-1/2 times the maximum allowable working pressure and held for four (4) hours. Certification of test to be supplied with unit data. X

Compressor discharge modulating pilot operated relief valve(s) sized for maximum available compressor flow rate at the highest suction pressure range. X

Unit bypass (downstream of cooler) with lubricated plug valve. Includes a valve operator Bypass size 1/2x the suction line diameter but not exceeding the discharge line size (minimum 2-3/8" O.D.). X

Gas suction piping, (inter-stage piping) and discharge piping designed for a maximum velocity of 33 ft/sec under all conditions specified in Section II routed to edge of skid. (just FYI: target pressure drop across unit= ~ 10psig..or 1%) X

A 2-3/8" O.D. flanged blow down connection supplied on-skid, valve shall be automatic tied to ESD. X

3.0 AERIAL COOLER

The fin-fan coolers are off-skid installation. Seller will provide estimates for on-skid mounted fin-fan.

	Include	Inspect
Fin-fan cooler for cooling oil and jacket water (cooler width not to exceed 14 feet (unless approved by TECO Peoples Gas).	X	
Fin-fan cooler for cooling gas (cooler width not to exceed 14 feet (unless approved by TECO Peoples Gas).	X	
Gas cooling sections equipped with manual louvers on water section of all units. (automatic louvers not required in warm climates)	X	
Separate Cooling Sections for:		
Gas for each stage of compression.	X	
Jacket water for engine.	X	
Water for auxiliary cooling, if required.	X	
Lube oil cooling (via Compressor manufacturer shell and tube exchanger located on skid)	X	
Hail screen, galvanized	X	
Fan guards	X	
Type cooler: Horizontal, forced draft cooler (Off-skid)	X	
[ ] Tubes parallel to longitudinal skid axis (F type-Large Units)		
[X] Tubes perpendicular to longitudinal skid axes (T type).		
Gas sections ASME code designed and stamped with the design pressure the same as the piping design pressure.	X	
Corrosion allowance included. 1/16" on gas section only.	X	
Cooler Fan Drive: belt driven from electric motors (2 x 25 hp fans per unit)	X	
[X] Electric motor drive (for electric units).		
[ ] Belt drive from engine		
[ ] Hydraulic drive from engine.		
Variable pitch fan blades (Manual).	X	

4.0 JACKET AND AUXILIARY COOLING WATER SYSTEMS

	Include	Inspect
Separate jacket and auxiliary water pumps, engine driven. Pump drive: [X] Belt drive from engine [ ] Electric motor drive (electric units) [ ] Hydraulic drive from engine	X	
3-way water thermostatic temperature control valve(s) for water systems.	X	
Jacket water and auxiliary water surge tank(s) with sight gauge, fill and vent connections and vent lines. Fill line down the side of cooler w/valve. Surge tank mounted atop the cooler.	X	
Jackets to be piped for water cooling in such manner to completely drain the jackets.	X	
Jacket water flow indicators out of each cylinder. (air cooled so n/a)		
Hand valves out of each cylinder to balance water flow. (n/a)		
Mixture of 50/50% water-glycol will be used.	X	

5.0 LUBRICATION

	Include	Inspect
Lube oil storage tank for engine and compressor (55 gal. day tank) with pyrex sight gauge (with guard), shutoff valve, and fire safe valve (pipe to engine and compressor oil meter and direct fill). Preferably mounted on top back side of the cooler with fill line and valve (heat traced if winterizing is specified).	X	

5.1 Engine

Lubrication system including a full-flow, free-standing, skid-mounted, oil filter with differential pressure gauge, lube oil pump, pressure relief valve, temperature control, pre-lube pump, oil strainer downstream of oil filter and related piping. Engine hot-start included on each unit.	X	

Shell and tube lube oil cooler designed for a minimum of 130°F using a 50/50%water/glycol mixture cooling medium. X

Oil level controller, w/ firesafe valve and integral sight gauge of pyrex glass capable of pressure up to 20 psig. X

Slow flow meter, Ren or equal with full flow strainer on the inlet. Capable of handling a pressure of up to 20 psig. Kenco level/ low flow switch (on oil day tank) X

Lube oil heating system. X

5.2 Compressor Frame

The lubrication system including a full flow oil filter with differential pressure gauge, lube oil pump, pressure relief valve, full flow oil strainer downstream of filter, lube oil cooler, temperature control and related piping.

Compressor oil system may be combined with engine lube oil system. X

Lube oil Seller option:
Shell and tube type cooler designed for 50/50% water/glycol mixture and a oil temperature of 170°F. X

Slow flow meter with strainer, Ren or approved equal, (May be combined with 5.2.4). Capable of handling a pressure of up to 20 psig. Kenco Switch X

Oil level controller, w/ firesafe valves and integral sight gauge on pyrex glass. Capable of handling a pressure of 20 psig. X

5.3 Compressor Cylinders

Force feed lubrication system, McCord-Trabon or approved equal (Ariel Standard is accepted). (Mini-lube) X

Lubricator no-flow alarm and shutdown to each master lubricator block. X

Lubricator make-up taken from compressor lube oil pressure system, with strainer, regulator and relief provided in the supply line	X	
Cylinder supports to be supplied, if required	X	
Primary compressor discharge pulsation bottles are not required to be skid mounted (single bottles, on skid, but internals TBD depending on analysis)	X	
Prefer to use the same oil for compressor, compressor cylinders and engine	X	

6.0 PIPING – GENERAL

	Include	Comments
Piping materials, design, fabrication and testing for all systems including main gas, fuel and starting gas, lubrication, water cooling and control piping in accordance with Section V. (Piping provided as standard equipment with the engine in the lubrication or cooling is exempt; rubber and brass lube oil lines are not allowed).	X	
Gas piping 2" NPS and larger shall be API 5L and shall be butt welded. Smaller piping may be socket or butt welded. Gas piping joints 2" NPS and larger shall be flanged. Smaller piping may be screwed. Taps under 2" NPS may use 3000# O-Lets.	X	
Welds on gas piping 2-3/8" O.D. and greater radiographed and acceptability verified in accordance with API-1104.	X	
Gas piping tested to a minimum of 1-1/2 times the design pressure for four hours in accordance with Section V.	X	
Gas systems, cooling systems, and lubrication systems in accordance with system flow diagrams in Section V.	X	

Line Locations are as follows:

The following lines run to the cooler end of the skid. No off-skid cooler piping is included.

Scrubber drains	X	
Common dirty oil (2-3/8" O.D.) drain line (cylinder distance piece drain may be connected to dirty oil drain system).	X	
Common clean oil fill line,	X	
Engine jacket water system drain/fill.	X	
Fuel gas connection.	X	
Starting Air/Gas Conn. (2-3/8" O.D. min.)	X	
Main gas discharge relief valve and vent main gas blow down connection.	X	
Fuel gas vent and relief.	X	
Starting air/gas exhaust.	X	
Main gas unit discharge piping.	X	
Main gas unit suction piping. Single flange at skid edge.	X	

The following lines provided on units to be installed on the skid located on the cooler side of the building to edge of skid:

Cylinder(s) packing and distance piece vent.	X	
Regulator vents and pilot vents on relief valves.		
The engine crankcase breather vent piped into the air inlet or exhaust.		
Control panel pneumatic lines to a common bulkhead and identified by stamping. Tubing bulkhead to be a mirror image of panel bulkhead. Wiring terminations to be labeled.		

7.0 SKID FABRICATION

	Include	Inspect
The unit skid(s) fabricated in accordance with Section V.	X	

8.0 MISCELLANEOUS

	Include	Comments
Heavy duty air cleaner with connecting piping and differential pressure indicator. Piping may be fabricated from light weight pipe, be made of corrosion resistant materials, and be properly supported. There are two on-skid, supported by engine with proper supports. [ ] Oil bath type, [X] Dry element type [ ] Mounted on Cooler, [X] Mounted accessible on skid [X] Mounted off skid	(included)	
Exhaust silencer supported on horiz cooler with stainless steel, flanged, expansion joint. (it will be provided ship loose. Install in field.)	X	

Capacitive Discharge Ignition System with sealed primary and variable control. (Primary ignition wiring enclosed in conduit.)	X	
Governor:	X	
[X] Hydraulic w/ air head		
Fuel/Air ratio control (variable system).	X	
Reversible manual barring jack w/ flywheel locking device.		
Fuel manifold gauge w/connections and valves to each engine manifold. Locally mounted.	X	
Solid type, completely enclosing, flywheel guard.	X	
Solid type, completely enclosing, coupling guard.	X	
Solid type guards on all rotating shafts, pulleys.	X	
Coupling Type: [X] Flexible Disc, [ ] Gear	X	
1/2" Drive for analyzer w/ 1:1 speed ratio. Waukesha standard RPM readings.	(yes, included)	

Compressor cylinder unloading. Indicate system included in base bid and furnish price for available options:

Hand operated fixed volume clearance pockets.	N/A	
Valve spacers.	X	
Fixed volume clearance bottle (removable).	N/A	
Remotely operated unloaders. (suction valve unloaders FO)	X (included)	
Remotely operated fixed volume clearance bottle.	X	

	Include	Inspect
Automatic operated variable volume clearance pocket (infinitely variable through range)- ***Included on (1) cylinder***. (no, fixed vol pockets)	1 cyl	
Compressor cylinder indicator connections on crank end and head end of each cylinder. 1/2" connections with Kiene or approved equal valves.	X	
Complete set of special tools. (One per station)	X	
All nipples double extra strong on screwed connections to piping or vessels where allowed.	X	
Sandblasting, cleaning, and painting of the units as per Section V. Color: [X] TBD, [ ] Bureau of Land Management Exposure: [ ] Div. 1, [X] Div. 2	X	
Walkway and steps for maintenance access to power all cylinders over piping, if applicable, on both sides of engine per OSHA requirements.	X	
Flashing supplied for units to be installed in building (flashing the width of the skid and extended above the cooler).	N/A	
On turbo-charged units, pyrometers to indicate temperature of each cylinder and a single point for exhaust.	X	
When unit is specified in Section II, 1.8.5 to be installed outside, rain shield is to be installed over engine spark plugs to prevent water accumulation in spark plug wells during inclement weather.		

9.0 PANELS AND CONTROLS

The unit panel and controls in accordance with:

[X] Section V, [ ] Attached Spec. X

9.1 Units Panel

Intrinsically safe electronics enclosed in a NEMA 4X enclosure.

Tachometer/Hourmeter/Overspeed	X	
Suction Pressure Gauge	X	
Interstage Pressure Gauge(s)	N/A	
Discharge Pressure Gauge	X	
Engine Lube Oil Pressure Gauge	X	
Compressor Lube Oil Pressure Gauge	X	
Engine Vacuum Gauge w/Selector Valve (control electronically now)	N/A	
By-pass Valve Control (open/close)	X	
Auto/Manual Eng. Speed control w/selector valve, loading regulator & pressure gauge.	X	
Control gas supply filter-regulator & dryer.	X	
Special Control Equipment (already included in std package)	N/A	

9.2 Class A Annunciated Shutdowns

Shutdowns are in effect at all times and identified with a white nameplate:

Plant ESD.	X	
Engine Overspeed.	X	
High Jacket Water Temperature.	X	
High Engine Lube Oil Temperature. Set at 10°F over maximum normal operating temperature.	X	
High Cylinder Discharge Gas Temperature (One on each volume bottle nozzle).	X	
High Discharge Gas Temperature (Down-stream of gas cooling). (gas temp off cooler is monitored and sent to compressor panel)	X	
High Discharge Gas Pressure (Before gas cooling on each stage).	X	
High Filter Separator Liquid Level (Each scrubber).	X	
High Engine Main Bearing Temperature.	X	
High Compressor Main Bearing. (thermo couple not needed)		
High Air Manifold Temperature (Turbo-charged Units Only).	X	
Low Suction Gas Pressure (each stage).	X	
Spare (3 total).	X	

9.3 **Class B Annunciated Shutdowns**

Shutdowns are locked out for a fixed time delay and identified with an orange nameplate:

Low Jacket Water Pressure.	X	
Low Engine Lube Oil Pressure.	X	
Low Compressor Lube Oil Pressure.	X	
Lubricator No-flow.	X	
Engine Vibration.	X	
Compressor Vibration.	X	
Turbocharger Vibration (if applicable). CU is turbo charged and area will be monitored typically with a Metrix brand instrument)	X	
Engine Overload.	X	
Cooler Vibration.	X	
Spare (2 total).	X	
Panel Mounted: [ ] On Skid, [X] Off-Skid (with 25' umbilical)	X	
Steel tubing on skid (nylon is allowed on low pressure control gas/air inside control panel).	X	
Electrical equipment and panels shall be weather and rain proof. Motors shall be TEFC rated.	X	

10.0 ELECTRIC START ALTERNATE

	Include	Inspect
Alternate cost required to implement electric start:		
Electric starter motor	X	
Battery Pack Single: [X] Redundant: [ ]	X	
Any required changes to wiring, umbilicals, programming, etc.	X	

SECTION IV – SELLER INFORMATION

1.0 INFORMATION RELEASE SCHEDULE

The packager shall provide the required information on the forms provided in this section when applicable.

Within ten (10) days of purchase order, provide four (4) sets of the following to the Project Engineer:

a. Project Schedule.
b. Information release schedule sheet.

Within six (6) weeks after award of purchase order, provide four (4) sets of the following to the Project Engineer for preliminary data:

a. General piping flow schematics: gas, oil, water and utility.
b. Unit elevation and plan drawings (piping connections, skid piping, equipment location and general equipment layout).
c. Vessel drawings. DRAWINGS COMPLETED SUBMITTED 2 WEEKS AFTER ACOUSTICAL STUDY IS RGB 12-4-19
d. Skid detail drawing and anchor bolt location.
e. ~~Instrumentation and electrical drawings.~~ WIRING INTERCONNECT DWGS. RGB 12-4-19
f. Analog data sheets

Within ten (10) weeks after award, provide four (4) sets of the following to the Project Engineer for approval.

a. Corrected or updated drawings listed in 1.3 above for approval.
b. Corrected unit specification sheet.
c. Packager material order and receiving schedule.
d. Panel drawings.
e. Fin-fan cooler spec. sheets or cooler manufacturer's equivalent.
f. Skid, compressor and engine design data.
g. Critical dimensions.
h. System capacities.
i. System design conditions.
j. Names of welders and qualifications and welding procedures. WELDERS AND WELDER QUALIFICATIONS AVAILABLE AT WEC SHOP DURING FABRICATION.

Two (2) weeks after receiving final analog information, provide six (6) sets of certified drawings to the Project Engineer. RGB 12-4-19

a. Piping, unit plan and elevations, equipment layout.
b. Vessels (including scrubbers and pulsation bottles).
c. Flow schematics: gas, water and oil.
d. Instrumentation and electrical including bulkhead.
e. Skid drawings.
f. Panel drawings, including layout.
g. Material List.
h. Fin-fan cooler specifications.
i. Recommended spare parts list.

Seven (7) days prior to unit shop test advise TECO Peoples Gas of the scheduled date.

Three (3) days before shop test, reconfirm shop test schedule with TECO Peoples Gas

Ten (10) days after unit is shipped, provide the following to the TECO Peoples Gas:

a. One (1) good quality reproducible set of the as-built drawings and one (1) set of prints.
b. Six (2) sets of engine and equipment manuals (Operation and Maintenance) with recommended spare parts stock list and four (4) sets electronic format.
c. Fin-fan cooler specifications or cooler manufacture equivalent.
d. Completed fabrication certification.
e. Completed list of control set points for calibration.
f. List of service personnel with phone numbers.
g. Brake specific fuel consumption (BSFC) versus percent of rated torque and BSFC versus percent of rated speed (rpm).

2.0 PROJECT SCHEDULE (BY SELLER SHARED POST CONTRACT)

Packager:_____ Project:_____

P.O. No.:_____ Date:_____

S.O. No.:_____ [ ] Original, Date_____

Order Received:_____ [ ] Revision Date_____

I. Data Release
   - A. Schedules
   - B. Data and Schematics
   - C. Approval Drawings
   - D. Certified Drawings
   - E. As-Built Drawings

II. Purchased Items
   - A. Engine
   - B. Compressor
   - C. Scrubbers
   - D. Cooler
   - E. Auxiliary Equipment
   - F. Control Panel
   - G. Piping
   - H. Steel

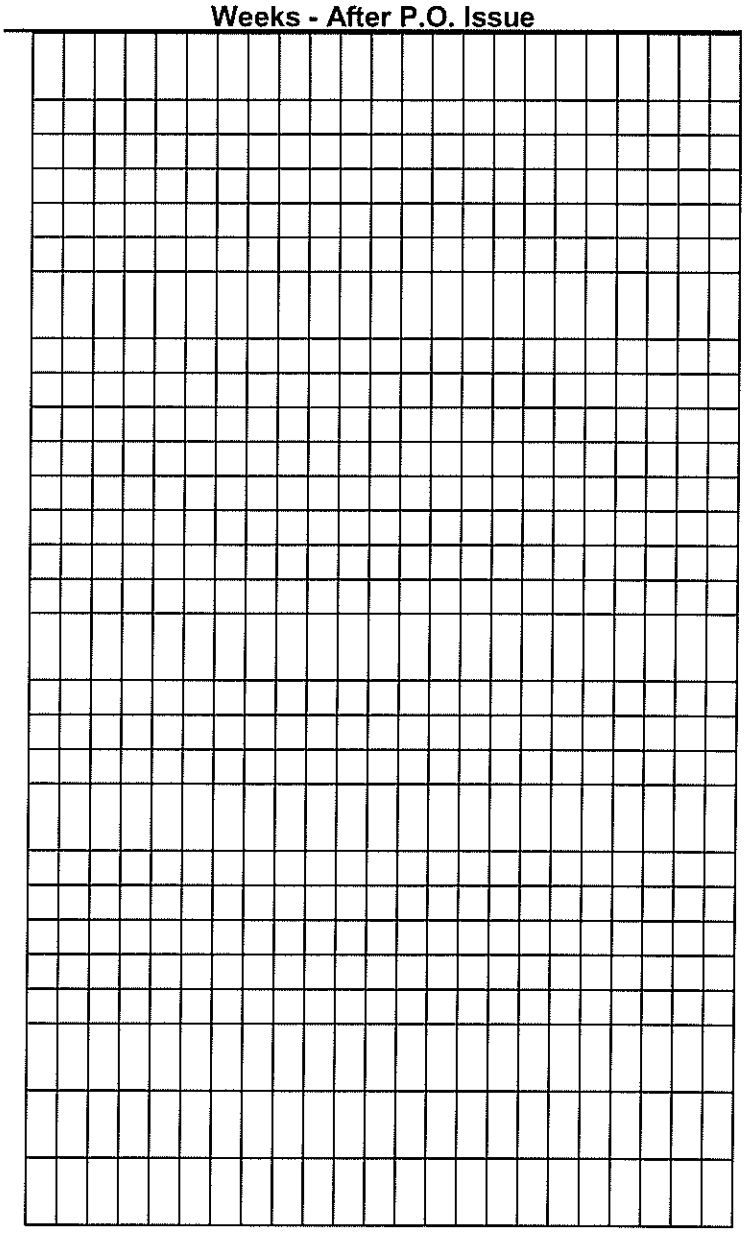
III. Fabricated Items
   - A. Skid
   - B. Piping
   - C. Bottles

IV. Assembly
   - A. Engine
   - B. Compressor
   - C. Auxiliary Equipment
   - D. Piping
   - E. Auxiliary Piping

V. Engine Shop Test

VI. Painting

VII. Shipment



3.0 INFORMATION SCHEDULE SHEET (BY SELLER SHARED POST CONTRACT)

Packager:_____ Project:_____

P.O. No.:_____ Date:_____

S.O. No.:_____ Revision No.:___Date_____

	Item	Scheduled Date	Received by TECO (PGS)
3.1	Project Schedule		
3.2	Preliminary Drawings and Data		
3.3	Approval Drawings and Data		
3.4	Unit Specification Sheet (Corrected)		
3.5	Packager Material Order & Receiving Schedule		
3.6	Panel Drawings		
3.7	Cooler Specifications		
3.8	Skid Compressor & Engine Design Data		
3.9	Critical Dimensions		
3.10	System Capacities		
3.11	System Design Conditions		
3.12	Analog Data Sheets		
3.13	Analog Study by TECO Peoples Gas (acoustic of compressor by vendor)		
3.14	All Certified Drawings		
3.15	All Certified Data/Specifications		
3.16	Instruction Manuals		
3.17	Spare Parts Lists		
3.18	As-Built Drawings		
3.19	Fabrication Certification		
3.20	List of Service Men's Names and Telephone Numbers		
3.21	Fuel Consumption versus speed curves		

4.0 COMPRESSOR BALANCE DATA (BY SELLER SHARED POST CONTRACT)

4.1 Component Weights

Packager shall furnish the component weights of each throw as determined in balancing the unit.

Cylinder No.	1	2	3	4	5	6
Main Rod Cap						
Main Rod						
Cross Head						
Crosshead Pin						
Piston Rod						
Piston Rod Nut						
Piston & Rings						

Opposing throw weights shall not vary more than 1/2 pound.

Total operating weight of skid and skid mounted items, including operating fluids:_lbs.

General arrangement of drawing showing center of gravity or coordinates of center of gravity of skid and all mounted items.

x =_____inches with reference to_____

y =_____inches with reference to_____

z =_____inches with reference to_____

4.2 Unbalanced Forces and Moments

	Primary	Secondary (@ _____ RPM)	(@2x _____ RPM)
		F_X = _____ lbs.	_____ lbs.
		F_Y = _____ lbs.	_____ lbs.
Apply unbalanced forces at:		F_Z = _____ lbs.	_____ lbs.
X = _____ in.		M_X = _____ lb-ft.	_____ lb-ft.
Y = _____ in.		M_Y = _____ lb-ft.	_____ lb-ft.
Z = _____ in.		M_Z = _____ lb-ft.	_____ lb-ft.

5.0 CRITICAL DIMENSIONS (BY SELLER SHARED POST CONTRACT)

5.1 Skid

	Feet	Inches
Width	_____	_____
Length	_____	_____
Height	_____	_____
Scrubber to End of Skid	_____	_____
Highest Point on Skid	_____	_____

- Specify item: _____ (normally exhaust pipe).

5.2 Centerline of Skid To:

Left cylinder outer end including clearance pocket:	_____	_____
Left piston pull distance:	_____	_____
Right cylinder outer end including clearance pocket:	_____	_____
Right piston pull distance:	_____	_____

6.0 SYSTEM CAPACITIES (BY SELLER)

Compressor lube oil system	_____ gallons
Engine lube oil system	_____ gallons
Engine jacket water system	_____ gallons
Engine auxiliary water system	_____ gallons

7.0 SYSTEM DESIGN CONDITIONS (BY SELLER SHARED POST CONTRACT)

	Temp. (°F)	Temp. Out (°F)	Flow (gpm)
Jacket water			
Auxiliary water			
Engine Lube Oil			
Compressor Lube Oil			

8.0 COOLER SPECIFICATIONS (BY SELLER SHARED POST CONTRACT)

Cooled Fluid	Jacket Water	Aux. Water	Gas
Temperature out (°F)			
Design pressure (psig)			
Specific gravity			
Specific heat			
Flow rate			
Fouling factor			
Heat rejected (BTU/hr)			
Surface area (sq-ft)			
Pressure drop (psi)			
Air Side			
Temperature in (°F)			
Temperature out (°F)			
Ambient design Temperature(°F)			
Air flow (lbs/hr)			
Other Data			
Fan blade pitch (degrees)			
Fan Horsepower			
Fan tip speed (ft/min)			
Tube material/gauge			
Header material/thickness			
Header corrosion allow. (in.)			

Dimensions (feet & inches): Width_____, Length_____, Height_____

9.0 FABRICATION CERTIFICATION (BY SELLER SHARED POST CONTRACT)

Project:_____

This certification shall be completed by the Packager and sent to the TECO Peoples Gas within ten (10) days after shipment of the unit.

I hereby certify that the fabrication of the gas compressor package and the associated gas piping furnished complete as a part of P.O. No_____.

does comply to the specifications and intent of ES-1620, dated:_____.

In addition, I certify that:

All materials furnished comply exactly to a referenced specification on the certified drawings and are in accordance with 49 CFR Part 192.

The main gas piping was hydrostatically tested to _____ psig for _____hours and the supportive records and charts are provided.

The fuel gas piping was tested to _____ psig for_____ hours and the supportive records and charts are provided.

The gas compressor cylinders were hydrostatically tested to _____psig for hours and the supportive records and charts are provided.

All vessels and gas coolers conform to the referenced specification and the manufacturer's data reports and test records are provided.

All equipment conforms to the referenced specifications and the records are provided.

All applicable welds on gas piping were radiographed and their acceptability verified in accordance with API 1104. All radiograph film and logs are available for inspection and will be sent to the Project Engineer if required.

The design fabrication and assembly of the total package does comply with all applicable OSHA standards.

All discrepancies, as listed by the Final Inspector, have been corrected. Attach one copy of the Check List, Section V, with discrepancies, with corrective action taken on each item.

Signature:_____Date:_____

Typed Name & Title:_____

TECO Peoples Gas Name:_____

SECTION V – DESIGN SPECIFICATIONS

1.0 GENERAL CONSIDERATIONS

1.1 The following are preferred Sellers for various components and subsystems of the skid mounted compressor unit.

1.1.1 Gas Engine: Waukesha

1.1.2 Compressor: Ariel

1.1.3 Control System: Allen-Bradley Control Logix

1.2 The following general requirements apply to the components of the skid mounted compressor unit.

1.2.1 All silencer(s) shall be hospital grade

1.2.2 All compressor systems shall be designed for pressurized standby.

1.2.3 All units shall be designed for natural gas transmission service.

2.0 REQUIREMENTS FOR ENGINE RATINGS

Units shall be rated at Packager's continuous rating with altitude and temperature derations applied in accordance with Packager's recommended procedure.

RPM turndown range and minimum RPM rating under a loaded condition shall be given.

The acceptability of units quoted shall be determined by TECO Peoples Gas after an evaluation of the unit's performance within the operating ranges as provided to the Packager in Section II.

3.0 SKID MOUNTED COMPRESSOR UNIT PIPING

All welds made on 2-3/8" O.D. and larger gas piping shall be 100% inspected using radiography in accordance with the requirements of API 1104. Welds that do not pass shall be removed or repaired at Packager's expense. No chill rings, back-up bars, bushings or similar fittings shall be used on gas piping.

Design factor for all gas piping shall be a minimum of 0.5.

Gas piping should be designed to provide a pressure drop not to exceed 1/4 psi per 100 foot (preferred) and a velocity not to exceed 35 ft/sec.

All screwed fittings, other than oil lines, shall be sealed with teflon tape. Any threads (pipe or bolts) operating above 500°F shall be made with an anti-seize compound. Double extra strong nipples shall be used when making screwed connections to vessels and piping greater than 2-3/8" O.D.

When a corrosion allowance is specified, the piping design will be checked against the proper standards, specifications or regulations for the anticipated corrosive conditions and the corrosion allowances added to the wall thickness or material modified as necessary.

All piping shall be clamped, as necessary to prevent vibrations to skid members (not deck plate) using hold down straps. Piping 2-3/8" O.D. and smaller may be clamped with U-bolts. Any piping not supported on the skid shall be supported with outriggers. Outriggers shall be designed to the same concrete elevation as the bottom of the skid and for field welding to the skid members. Half soles shall be installed on pipe 6-5/8" O.D. and larger at all pipe support locations.

3.1 Cleaning of Pipe

Before it is installed, all steel pipe shall be thoroughly swabbed and cleaned on the inside and outside.

The Packager, after fabrication and testing of the system piping, shall thoroughly clean the inside of the pipe to remove all weld slag, dirt, sand, water and other foreign objects from the piping. Any damage to equipment and/or other consequential costs resulting from incomplete cleaning of the piping shall be at the expense of the Packager.

The Packager shall be responsible for pickling the oil lines.

All piping, tubing, oil coolers and oil filters shall be located to allow 24 inches minimum clearance for access to the engine maintenance panels without disassembly of the lube oil system.

4.0 SKID DESIGN

The unit skid shall be of sufficient strength to prevent misalignment caused by loading and hauling. Skids shall be designed for placement on a concrete pad without grout. Unless specified otherwise by the Project Engineer. The skid member shall consist of four W.F. beams with a minimum depth of 18 inches running the full length of the skid. The center beams may be of greater depth to meet the elevation requirements for mounting the driver and compressor. The longitudinal beams shall be connected with transverse, full-depth, W.F. beams as necessary to provide the necessary skid strength. All W.F. beams shall have 3/8" minimum thickness. A structural analysis of the skid shall be conducted to include at least In-situ, lifting, and transportation cases.

Full-depth, W.F. beams shall be used under skid-mounted, auxiliary equipment such as lube oil coolers and scrubbers to provide full stability if such equipment is to be mounted on the main skid.

The unit skid shall be a minimum of 10'-0" wide with sufficient length to mount the required equipment. Anchor bolt holes shall be 1-1/2" diameter and spaced a maximum of 5'-0" along the two outboard runners at standard gauge distance from the web. Anchor bolt holes shall be provided for the center runners if recommended by the Packager. Leveling bolts shall be 1-1/4" diameter and located six inches from each anchor.

If specified in Section III, the scrubber(s) are to be mounted on the skid and shall be supported on W.F. beams on four sides. Between the W.F. beams and the scrubber base plate, a one-inch plate shall be continuously welded to the skid beams. The scrubber may be welded to the base plate. If

the scrubber(s) are to be located off the compressor skid, a minimum of four 7/8" diameter anchor bolt holes shall be drilled in the vessel base plate at 45° from the vessel centerline.

The steel shall be ASTM A36 or A572 Gr. 42 through Gr. 50 material. For structural steel welding, either E-7010 or E-7018 electrode shall be used.

Decking shall be continuously seal welded (one side) to the skid beams with sufficient sections between interconnecting beam members made removable to allow access to center beam members if required for anchor bolts. The jack screw locations shall be of sufficient strength to lift the skid and mounted equipment without permanent deformation. If deformation is anticipated, the jack screw locations shall be reinforced with stiffeners.

If outboard cylinder supports are required by the compressor manufacturer, they shall be mounted to the skid. Cylinders requiring support may be supported by the discharge pulsation dampeners.

The fin-fan unit skid does not need to be mounted on the engine/compressor skid. However, the fin-fan skid shall be structurally sound with a minimum 6"x4" W.F. beam. The loaded skid shall not deflect more than the length in inches divided by 180 or the fin-fan fabricator specifications, whichever figure is less, by hauling and loading operations.

The engine oil filter shall be mounted on the skid or an outrigger and shall be rigidly supported. The filter base plate shall be firmly bolted to a 1" plate which is continuously welded to two W.F. beams. The filter shall be located to allow at least 24" clearance for engine maintenance access doors.

5.0 AIR COOLED HEAT EXCHANGERS

Air cooled heat exchangers shall be in accordance with this specification

6.0 UNIT CONTROLS

6.1 General

The unit control panel shall be based on the size of engine driver or, if specified as an option, a control panel meeting a separate specification and supplied either by the Packager or the TECO Peoples Gas. A special control panel specification will be provided for electric motor driven compressors.

6.2 Units Control Panel

Control panels shall consist of an intrinsically safe annunciator and unit shutdown system. See Section III for unit functions to be monitored. Additionally, the panel shall contain engine speed control, process and instrument gauges, fuel air ratio control and related controls as listed below if applicable.

6.2.1 Gauges

All control panel gauges shall be flush mounted, industrial grade with 1% accuracy.

Provide combination pressure gauge/end devices for the following. Devices shall be 4-1/2" diameter, switch gauge type, hermetically sealed magnetic switch, pulsation dampened, liquid-filled with blow-out rear cover.

Suction Gas Pressure
Interstage Gas Pressure(s)
Discharge Gas Pressure
Engine Lube Oil Pressure
Compressor Lube Oil Pressure

- ***Electronic speed control is standard.***
- ***Electronically controlled by solenoid.***
- ***Only transmitters are wired to the PLC***

Each panel and its related end devices shall be rated for abusive transport and properly labeled to ensure that items are not damaged or lost in transit. In addition, the following measures shall be taken:

a. All external connections shall be protected by temporary covers to exclude dirt and other foreign matter.
b. The panel and components shall be wrapped and sealed with waterproof plastic before crating.
c. Packing material shall be placed around all sides of the panel and components.
d. The panel and components shall be shipped in a heavy-duty container and the container shall be sealed with strong tape or metal bands.

7.0 ELECTRICAL DESIGN CRITERIA

This section outlines electrical requirements for the design, equipment, materials and installation for the required transfer pumps, gas and water cooling, grounding and control for engine-driven compressors. If the compressor is to be motor driven, additional specifications will be enclosed.

Design and installation shall be in accordance with good engineering practice and in compliance with applicable codes and standards.

Electrical equipment shall conform to applicable requirements of the latest edition of:

NEMA	National Electrical Manufacturers Association
ANSI	American National Standards Institute
IEEE	Institute of Electrical and Electronic Engineers
UL	Underwriters Laboratories
FM	Factory Mutual
CSA	Canadian Standards Association

The electrical design shall conform to applicable requirements of the latest edition of:

NEC National Electrical Code (NFPA20, ANSI-C1)
OSHA Occupational Safety and Health Act
NFPA National Fire Protection Association
Other federal, state and local codes having jurisdiction

The electrical system, including all motors, components, wiring and conduit, shall meet the requirements for installation in a Class I, Division 2, Group D hazardous area.

Galvanized rigid steel conduit and compatible fittings shall be used for all wiring on compressor skids other than intrinsically safe wiring to the control panel. Conduit seals shall be installed in accordance with code requirements. All seals shall be poured by the TECO Peoples Gas in the field after installation of the unit. Wiring for intrinsically safe control panel and end devices shall be protected from physical damage.

All motors shall be connected with liquid-tight, flexible conduit of sufficient length to allow mechanical disconnection of motor shaft and removal and/or disassembly of driven unit without electrically disconnecting the motor.

All conductors shall be stranded copper. Power and control wiring for 600-volt service (480-volt, 120/208 or 240-volt AC and 24 or 125-VDC) shall have 600-volt, 90°C, filled cross-linked polyethylene, XHHW insulation for conductors #6 AWG. and larger. Conductors smaller than #6 AWG shall have 600-volt, 75°C, THW or THWN insulation. Instrumentation wire shall be #16 AWG. (multipair cables may be #18 or #20) with 300-volt, 75°C, XLPE or PVC insulation with an outer PVC jacket. Wire may be single or multi-pair and individually shielded including tinned-copper drain wire as required. All pairs shall be twisted. Thermocouple extension wire insulation shall be suitable for the temperature of the location in which the wire is to be installed.

Heavy duty, corrosion resistant terminals shall be used for all equipment requiring terminations for field wiring. One common junction box for control circuits and one common junction box for power circuits shall be provided at the edge of the skid for field termination.

All control wiring shall be terminated with compression terminals or pre-insulated, diamond grip, spade terminals. All power conductors shall use compression type terminals. All conductors shall be identified at each end with permanently imprinted tubular wire markers indicating circuit and wire designation.

Electronic instrumentation cables shall be provided in continuous lengths and will not be run in the same conduit with power conductors. When discontinuous lengths are unavoidable, approved terminal boxes with terminals shall be provided as junction points.

Explosion proof motors shall comply with the requirements of UL, FM or CSA for hazardous locations, and shall bear a label. Motors greater than 10 HP shall not exceed locked rotor ratings of code letter "F". All 460-volt motors are to be of the grounded wye configuration.

Recommended motor operating and control voltages follow:

Horsepower Range	Operating Voltage	Control Voltage
Fractional to 1/2	115 VAC, Single-Phase	115 VAC, Single-Phase
1/2 - 175	460 VAC, Three-Phase	115 VAC, Single-Phase

All motors used in remotely controlled, automated systems shall have locally mounted "HOA" (Hand, Off, Auto) switches. Controllers for 460-VAC motors shall be full-voltage, three-phase, 460-volt, 60-HZ, consisting of combination thermal magnetic circuit breakers and magnetic starters. Starters shall be furnished with ambient compensated, overload relays and 120-volt control power transformers. Control power transformers shall be fused both primary and secondary.

Electrical symbols and abbreviations shall conform to ISA and ANSI standards.

8.0 HYDROSTATIC TESTING

The fabricator shall hydrostatically or pneumatically test all gas piping in accordance with 49 CFR Part 192.

The main gas piping shall be tested to a minimum of 1.5 times the design pressure. The maximum flange hydrostatic test pressure shall not be exceeded. The hydrostatic test shall be held for a minimum of four (4) hours above the minimum test pressure without repressuring except to adjust for temperature changes.

Skid-mounted fuel and starting gas piping with a design pressure of 150 psig or less may be tested with air or nitrogen. The air/nitrogen test shall be performed at 1.5 times the fuel gas piping design pressure for a period of one (1) hour. All joints shall be tested with a soap solution for leakage.

The hydrostatic test of all scrubbers, volume bottles and gas coolers shall be in accordance with ASME Section VIII with a test period of four (4) hours minimum.

The Packager shall use a dual pen recorder with 24-hour circular chart to record pressure and ambient temperature of all hydrostatic tests. The pressure recorder shall have been calibrated by dead weight tester per manufacturer's instructions. The calibration date and calibrator shall be noted on face of the recorder. All recorders shall have been calibrated within six months before testing.

The test will be accepted when, considering all factors of pressure, temperature and visible inspection, the entire system is free of leaks and the test pressure has been held for the specified time period.

The pressure test records shall be provided with the following details:

a. Labeling of recording chart (pressure, temperature, time),

b. Identification of tested section of piping,
c. Piping design pressure and design temperature,
d. Date and name of inspector,
e. Purchase order, job order and job name,
f. Description of leaks, repairs, defective materials or faulty workmanship.

At the completion of the hydrotest, the fabricator shall drain, clean and dry the tested piping with compressed air.

9.0 WINTERIZATION AND INSULATION

This part covers the winterization and insulation of skid mounted compressor units. This part shall be followed when specified in Section II, if electric power is available. All the heat tracing shall be electric, otherwise engine jacket water shall be used.

9.1 Engine Oil Heater

An external positive flow engine oil heater package will be installed. The unit will consist of a pump to circulate warm oil throughout the engine and heater. The heater package will maintain the oil at 60°F. The package shall have a shutdown to protect the oil from being overheated. The heater package will be designed to automatically be energized when the engine is not running. In addition, an insertion type heater as described in 8.2.1 will be provided for the compressor crankcase.

The Packager shall supply 1-1/2" screwed valves with plugs for auxiliary jacket water heating on the engine side of the jacket water pump and temperature control valves. Heater to be supplied by the TECO Peoples Gas.

The Packager shall supply all necessary motor starters, circuit breakers, control logic, wire and switches for the engine oil heater.

9.2 Heat Tracing – N/A

10.0 PAINTING

Painting and preparation as described below:

☐ Standard UE Compression Type 4 paint system as follows:

10.1 SSPC-SP6 sandblast of non-painted items:

Including skids, vessels and process piping. Pre-painted items will be cleaned and top coated only. All other piping will be prepped by SSPC-SP1, 2 or 3, primed and top coated.

10.2 Tnemec or equal high build epoxy primer, 4-6 mils (dry).

10.3 Tnemec or equal Series 73 polyurethane enamel top coat, 2-3 mils (dry).

10.4 Color: UE standard paint color gray full paint spec required at drawing approval.

11.0 TESTING AND INSPECTION

11.1 Engine Manufacturer Shop Test

The engine shall pass the manufacturer's standard shop test prior to shipment to the Packager. Certified test logs shall be provided for the test including any necessary calculations to verify the performance capability and fuel consumption of the engine.

11.2 Unit Shop Test

The Packager shall perform a unit shop test prior to shipment to confirm operation of the complete unit.

The shop test run duration shall be a ***minimum of one hour.*** Checks and verifications of all systems including a functional test of all protective shutdowns shall be made during this test run. All controls and operating set points shall be at their recommended set points.

The recommended operating fluids will be used during the test with a 50/50 glycol water mix for the cooling systems.

The Packager shall notify the Project Engineer seven (7) days prior to the test and confirm the test two (2) days prior to the test. Any added costs incurred by the TECO Peoples Gas due to delays of the test or additional test trips shall be at the Packager's expense.

11.3 Shop Inspection

A shop inspection may be made by the TECO Peoples Gas. The inspection will be based on the "Final Inspection Check List" in this section. A copy of the list will be given to the Packager upon completion of the inspection.

If the unit meets all requirements and no discrepancies are noted, the inspector may release the unit for shipment at the time of inspection. If the unit has not been released for shipment by the inspector, a written release must be obtained from the TECO Peoples Gas prior to shipment. A letter stating the correction made for each discrepancy and items to be shipped loose must be sent to both the Project Engineer and Project Buyer for review within five (5) days of shipment.

11.4 Final Inspection Check List (By Purchaser's Inspection)

Project:_____ Proj. No._____

Packager:_____ S.O. No._____

Shipping Date:_____ P.O. No._____

Inspectors: Mechanical_____ Date:_____

Electrical_____ Date:_____

CHECKLIST

Remarks

a. Equipment Check

Engine Mfr. and Model _____

Compressor Frame Model _____

Cylinder Size and Model _____

Cooler Size and Model _____

Suction Scrubber Size and Model _____

Interstage Scrubber Size and Model _____

b. Meets Specifications, Section III _____

c. Flow Schematic Conformance _____

Process Gas _____

Fuel Gas _____

Engine J.W. _____

Auxiliary J.W. _____

Starting Air/Gas _____

Engine L.O. _____

Compressor Frame L.O. _____

Lubricator Oil _____

J.W. and L.O. Fill and Drains _____

Shutdown Points and End Devices_____

PI's, TI's, PT's, TT's _____

d. Dimensional Check — Remarks

Skid Dimensions _____

Suction and Discharge Lines _____

Utility Fill and Drains _____

Fuel Gas _____

Vent and Relief Lines _____

Starting Air/Gas Line _____

Anchor Bolt Holes _____

Gas Scrubbers _____

Tubing Bulk Heads _____

e. Piping in Accord w/analog Study

Piping _____

Pulsation Bottles _____

Orifice Plates _____

f. Unit Shop Test

Running Time:_____Minutes_____

Vibration Check Thru Speed Range _____

Oil/Water Leaks _____

Driver/Compressor Operation _____

g. Record Review

HydroTest (Pressure and Time)_____

Radiograph _____

Stress Relief (Temp. and Time) _____

Material Reports _____

Mill Test Reports _____

ASME Certifications _____

Instrumentation — Remarks

- Panel _____
- End Devices _____
- Tubing Quality _____
- Functional Check _____
- Instrument Loop _____

i. Electrical

- Functional _____
- Circuit Schematic _____
- Hazardous Class Location _____
- Conduit Installation and Drainage _____

j. Codes and Regulations

- 49 CFR Part 192 _____
- OSHA _____
- ASME Code _____
- NEC _____

k. Weld Quality

- Visual of Piping _____
- Visual of Skid _____

l. Skid Package Appearance _____

m. Accessibility for Maintenance

- Engine _____
- Compressor _____
- Panel _____
- Scrubbers _____

n. Miscellaneous — Remarks

Bracing Piping and Equipment _____

Floor Plate _____

Walkways and Steps _____

Skid Construction _____

Cylinder & Bottle P & T Taps _____

ASME Stamps _____

Belt and Coupling Guards _____

Fire Safe Valves in Oil Lines _____

No Bushings in Gas Piping _____

Tubing and Piping Holddown Straps

_____

Flanges Two-Holed _____

No Rubber or Plastic Hose _____

Painting _____

Winterization _____

11.5 Discrepancy List

	Discrepancy	Corrective Action Taken
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

Release Form

[ ] Released for Shipment by TECO Peoples Gas Representative

[ ] Hold shipment for correction of discrepancies as listed.

By:_____ Date:_____

Verification:_____

All discrepancies as listed have been corrected as noted.

By:_____ Date:_____

Packager:_____

Project:_____ P.O. No.:_____