SECTION 15575
LANDFILL GAS BLOWER ASSEMBLY

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section covers the requirements for supplying a landfill gas (LFG) vacuum blower skid assembly with a remotely mounted control panel to safely collect LFG.

B. This Section specifies the material and performance requirements for a prefabricated and tested LFG handling system.

1.02 RELATED WORK

A. Section 16401, Low-Voltage Electrical Work—General Requirements.

1.03 SUBMITTALS

A. Shop drawings shall be submitted before any materials described in this section are delivered to the job site. Shop drawings shall include the following minimum information:

1. Equipment dimensions, component parts, and list of materials.
2. Installation and mounting details.
3. Electrical wiring diagram and details.

B. Materials List: A list of all materials and equipment proposed to be furnished and installed under this portion of the work shall be submitted, giving the manufacturer's name, catalog number, and catalog cut for each item where applicable.

C. Supplier's Recommendations: Accompanying the materials list, the supplier shall submit the manufacturer's current recommended method of installation for materials provided.

D. The Supplier's written report certifying that the equipment has been properly installed, connected, and adjusted correctly in accordance with the manufacturer's requirements.

E. Certification of UL listing for the completed assembly. Failure to supply this certification before shipping will result in the County's rejecting the delivery.

F. Submit warranties as specified in this Specification.

G. The Supplier shall provide a detailed Operation and Maintenance Manual before Final Acceptance. The Operation and Maintenance Manual shall include all components of the prefabricated blower unit.

1.04 WORK SEQUENCE (NOT USED)

1.05 REFERENCE STANDARDS

Reference standards and recommended practices referred to in this Specification Section shall be the latest revision of any such document in effect at the bid time. The following documents are a part of this Section. Where this Section differs from these documents, the requirements of this Section shall apply.

A. National Fire Protection Association (NFPA)

1. NFPA 70—National Electrical Code (NEC).
2. NFPA 497—Recommended Practice for the Classification of Flammable Liquids, Gases or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.

B. Underwriters Laboratories, Inc. (UL)

1. UL 50—Enclosures for Electrical Equipment.
2. UL ~~698—Industrial Control Equipment for Use in Hazardous (Classified) Locations~~.
3. UL ~~698A—Industrial Control Panels Relating to Hazardous (Classified) Locations~~.

Deleted: 508

Deleted: Standard for Industrial Control Equipment

Deleted: 508A

Deleted: Standard for Industrial Control Panels

1.06 QUALITY ASSURANCE

A. Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of LFG handling, processing, and combustion systems and with a history of successful production acceptable to the Engineer.

B. The complete system (final assembly, including control panel, conduits, and wiring) must be UL listed or approved by an independent third-party testing agency as suitable for the intended use as an explosive gas handling system. The testing agency must be a Nationally Recognized Testing Laboratory (NRTL).

1.07 WARRANTIES

A. All materials, equipment, and workmanship included in the system shall be guaranteed against failure for 1 year from the date of Final Completion.

B. The supplier shall repair or replace defective materials, equipment, and workmanship at no additional cost to the Owner if such materials, equipment, or original workmanship fail within the warranty period.

1.08 DELIVERY, STORAGE, AND HANDLING

A. The equipment provided under this Section shall be shipped to the site by the supplier and unloaded under the supervision of the Owner.

B. The supplier shall deliver materials in the manufacturer's original packaging with all tags and labels intact and legible.

1.09 QUALIFICATIONS (NOT USED)

1.10 TESTING REQUIREMENTS (NOT USED)

1.11 MAINTENANCE (NOT USED)

1.12 OPERATIONS AND MAINTENANCE (O&M) MANUALS (NOT USED)

1.13 PERFORMANCE

A. Operating Conditions: The landfill blower station shall be capable of operating under the following performance requirements and operating ranges:

1. Site Elevation: 125 ft. above MSL.

2. Ambient Temperature: Design range from 10° F to 100° F.

3. Gas Flow Rates: Variable from 10 to 60 SCFM.

4. Minimum Gas Pressure: -30 in. W.C. @ blower inlet and +10 in W.C. @ blower outlet.

5. Maximum Inlet Gas Temperature: 125° F.

B. Landfill Gas Composition: In the absence of actual qualitative gas data, the composition of the landfill gas for this project may be assumed to be as follows:

Constituents:	% by Volume
Methane	0 to 60
Carbon Dioxide	0 to 60
Oxygen	0 to 21
Nitrogen	0 to 78

The gas will be 100% saturated with water vapor.

PART 2 PRODUCTS

2.01 GENERAL

A. Approved Suppliers: The blower/condensate skid, including all components listed in this Section, shall be manufactured by BETX Solutions, or equal, as approved by the Engineer.

B. System Certification: The complete installed, system must be UL listed or approved by some other NRTL.

C. Additional Requirements: The system shall be designed and installed so that it meets the requirements of the NEC and NFPA 497 for Class I Division II locations.

2.02 GAS HANDLING SYSTEM

A. Gas Handling Skid System: The gas handling skid system shall be a pre-fabricated system as manufactured by BETX Solutions, Inc., or equal, and shall include the following components:

1. Inlet/ Outlet shall be 4-inch-diameter IP ANSI 150 flange connections with DI back-up rings.

2. Blower: AMETEK Rotron Blower, Model Number EN404AR58ML, 1 hp, 230V, single phase.

3. Condensate Moisture Separator: Gasho moisture separator, Model Number GX-100DL with SS inline filter/ demister material:

a. Clear PVC 2-inch Site Tube with three XP float level switches.

b. 4-inch side-access port.

c. Oberdorfer Bronze Gear Pump Model 992R with ½-Hp, XP, 230V, single-phase motor rated for 4 GPM.

d. Manual sludge pump, check valve and drain valve.

4. Vacuum Relief Valve: Fisher, Model Number 289H-41.

5. Vacuum Gauge: 0-160 inches W.C.

6. Pressure Gauge: 0-6 psi.

7. Piping Materials: PVC and galvanized steel.

8. Structural Base: Aluminum, welded.

9. System Control Panel: As described below.

10. Air Flowmeter: Rotron, Model Number FM20C125Q.

11. In-line Flame Arrestor outlet.

12. Explosion-proof junction box for connecting control wiring conduits from control panel.

B. System Control Panel: At a minimum, the system control panel shall include the following:

1. NEMA 4X stainless-steel enclosure.

2. Hand-Off-Auto (HOA) switches for transfer pump and blower.

3. 24-hour electronic timer – Intermatic ET 1100 or equal.

4. Combination motor starters for each motor.

5. Adjustable time-delay relay.

6. Run light for each motor.

7. Alarm lights (Hi Level, Motor Thermostat, (1) spare).

8. Xenon strobe alarm light mounted on top of the control panel enclosure.

9. Four-channel autodialer.

10. Transient voltage surge suppressor.

11. Elapsed-time meter for each motor.

12. Enclosure heater with thermostat.

13. Single-phase voltage monitor.

14. Alarm reset button.

15. Control circuitry and/or programming for manual and automatic operation, including generating and transmitting alarms to the alarm lights and autodialer.

16. Refer to Section 16401 and the Contract Drawings for additional requirements.

C. Operational Description: The Gas Handling Skid System shall operate in the following manner:

1. All HOA switches shall be supplied with a spring return on the HAND position to prevent the transfer pump or blower from operating continuously without the safety controls in place.

2. When the blower HOA switch is set to HAND, the blower shall operate continuously.

3. When the blower HOA switch is set to OFF, the blower shall shut off and remain off.

4. When the blower HOA switch is set to AUTOMATIC, the blower shall operate based on a signal from the electronic timer.

5. The blower shall shut down and activate an alarm upon a motor overload condition or upon receipt of a low-voltage alarm from the voltage monitor.

6. When the transfer pump HOA switch is set to HAND, the transfer pump shall operate continuously until it receives a low-level signal from the low-level float switch and then shut down.

7. When the transfer pump HOA switch is set to OFF, the transfer pump shall shut off and remain off.

8. When the transfer pump HOA switch is set to AUTOMATIC, the Hi-Level switch shall turn the transfer pump on to drain the water from the

Condensate Knock Out tank. The Low-Level switch shall turn the pump off when the water level returns below the low-level switch. The Hi Hi-Level Switch shall shut off the entire gas handling skid system.

9. A high-level alarm shall activate if the level at the transfer pump reservoir exceeds the maximum acceptable level for a preset adjustable period.

10. The transfer pump shall shut down and activate an alarm upon a motor overload condition or upon receipt of a low-voltage alarm from the voltage monitor.

11. All alarm conditions shall activate their respective alarm lights and the xenon strobe on top of the control panel.

12. All alarm conditions shall be wired to the autodialer.

PART 3 EXECUTION

3.01 INSTALLATION

A. The gas handling skid system shall be installed in strict accordance with the manufacturer's recommendations.

B. The system shall be installed plumb and perpendicular to piping where required on the Drawings.

C. The supplier shall inspect installation before start-up and testing and shall provide certification as required by Paragraph 1.07B.

D. The control panel shall be mounted remotely from the blower skid and installed in the following manner:

1. The control panel shall face the blower skid, with the face of the panel at least 15 feet away from the edge of the blower skid.

2. Conduits between the control panel and the blower skid shall be PVC-coated rigid galvanized steel.

3. Conduit seals shall be provided below the control panel for all conduits extending to the blower skid.

4. Conduit seals shall be within 18 inches of where the conduits exit the ground.

5. All mounting hardware shall be No 304 or No 316 stainless steel.

6. Control wiring shall terminate in an explosion-proof junction box on the blower skid.

3.02 STARTUP AND TESTING

A. Factory Test: The gas handling skid system shall be tested at the supplier's plant before delivery to the site. Before shipment, complete test reports shall be made available showing that all system controls operate correctly.

B. Start-Up: The supplier of the gas handling skid system shall provide on-site start-up assistance for 4 hours. In addition the supplier shall furnish an operation and maintenance manual, including startup and shutdown procedures.

C. Functional and Validation Tests: Once the gas handling skid system is installed, the supplier shall perform functional and validation tests. Validation testing shall include demonstrating manual and automatic modes of operation.

D. Certification: Following testing, the supplier shall submit_the performance test data and emissions analysis in accordance with Paragraph 1.07B. The certification shall document compliance with performance criteria established in this Section.

3.03 INSTRUCTIONS

A. When all required approvals of this portion of the work have been obtained, and at a time designated by the Owner, thoroughly demonstrate to the Owner's operation and maintenance personnel the operation and maintenance of all items installed under this Section.

B. The 8-hour training shall be separate from the installation, start-up, and equipment adjustment services.

END OF SECTION