October 9, 2012

ADDENDUM No. 1
Merritt College Bid No. 12/13-03 -CHW Infrastructure Project

This Addendum modifies the original Bid Documents for the above Bid. Acknowledge receipt of this addendum in the space provided on the BID FORM. Failure to do so may subject Bidder to disqualification.

CLARIFICATIONS:

The following questions were submitted for response by Ranger Pipelines, Inc.:

Q1: Bid documents – 00400 Bid form has no descriptions in bid items, but appears as if to be edited. Is there a clean set to be processed for the bid?
   A1: The Schedule of Bids table was changed to include project descriptions. See Changes to Project Manual shown at the end of this Addendum.

Q2: Several sections within the 3 PDF documents provided are repeated (Division 1, Technical specs, Technical specs Part 2). Are all 3 repeated sections the same? It would appear that the index for each is slightly different. For example Division 1 index- ends with 32 31 13, Technical specs index- ends with 33 71 19, Technical specs Part 2 index- ends with 33 71 19… But then even the pages contained within them are overlapping - Division 1 pages (after titles) starts at 00010 and ends with 01 60 04, Technical specs pages (after titles) starts at 01 10 00 through 33 71 19 with Jensen cut sheets and ends with 01 79 00, Technical specs 2 pages (after titles) starts at 01 13 00 through 33 71 19 with Jensen cut sheets.

   A2: There is a duplicate of Technical Specifications in the Project Manual. Use the first part of Specifications 00001 to 00910 and the second part of Specifications 01 10 00 to 33 71 19. The index has been changed to show all sections that are included in the Project Manual, see attached index. Section titled, “ELECTRICAL UNDERGROUND DUCTS AND MANHOLES, was deleted.

Q3: Bid documents Division 1 - 18th page allow RFI up to within 10 days of bid on enclosed form, yet no form was found.
   A3: Use the attached RFI form.
Q4: Plan sheet AS2.2, building “F” shows a partial roof pipe enclosure, with reference to see MP1.4 for continuation. However, there is no continuation or call out of the screening with regards to a limit point. Please provide this information, or a way to determine it’s extent.
   A4: The reference should be to see AP1.4 for continuation. The drawing was changed.

Q5: Building F and Q have no access panels shown on the AS sheets?
   A5: Building ‘F’ does not require access panels on the enclosure since the valve are exposed. Building ‘Q’ enclosure that replaces existing enclosure will require access panel at the same location. Please see reference sheet note #8/AS 2.4.

Q6: Detail 4/AP-5.3 note about header between sleepers 10’OC is unclear, please explain how this works where noted.
   A6: Sleepers to occur 10’ O.C. with steel channel to span between sleepers supporting the enclosure. Refer to AP 1.4 for typical sleeper location.

Q7: AS-2.4 Panel enclosure has no section. Are we to assume 2/AP-5.3 with a solid bottom and roofing along the horizontal 38’6” callout?
   A7: Sheet AS 2.4 references detail #1 and #2 of sheet AP 5.3. In addition, see 4/AP-5.3 for additional notes.

Q8: APD-1.1 notes 4 & 7 are not visually called out. Where do they occur?
   A8: Between grid line 4 and 5 at existing room F127. This will be part of the new staircase.

Q9: Detail on sheet AP-5.1 shows bollards. Where can I find them occurring on the plans?
   A9: Bollards will not be required for this phase of construction and can be omitted.

Q10: The Schedule of Bid Prices (Section 00400-2) does not appear to be complete. Bid items 1-4 in the ‘description’ column read ‘Enter Bid Item ___’; likewise with the alternates. Please clarify what each bid item is for (i.e where the Owner wants cost allocated to). It would be helpful to us if a comprehensive bid item description section was added to the specifications.
   A10: The Schedule of Bids table was changed to include project descriptions. See Changes to Project Manual shown at the end of this Addendum.

Q11: Section 00450 Article 1.1.1.2 states that in order to be qualified, a general contractor must have completed DSA projects of a similar nature with a contract value of $1mil each or $5million aggregate. We do not meet this requirement; however we have performed similar projects for U.C Berkeley and U.C San Francisco within the last 5 years with each respective contract being, $3.5mil, $21 mil, $19 mil, and $6.5 mil. Is this demonstratable experience acceptable in lieu of the DSA requirement? Can we fulfill the DSA requirement by ensuring that our subcontractor (for the ‘B’ license scope) has the DSA work experience stated?
   A11: The District will allow for the subcontractors to have the DSA qualifying experience in lieu of the general contractor.

Q12: On sheet MS-5.3, all 4 manholes, the plan view vs view A-A conflicts between same pipe support callouts as PS-1 vs PS-2. Yet on sheet MP-5.1 it would appear that neither is correct per detail 3 and 17. Are these supposed to be detail 6 on MP-5.1?
A12: Drawing MS-5.3 was changed to show PS-1 is the only stanchion used. Use Detail 6 on MP-5.1 for stanchion detail.

Q13: Sheet MS-7.1 Manhole 17 has differing quantity of vents than shown on MS-5.3. Which is correct?
   A13: Drawing MS-7.1 has the correct amount of vents. Drawing MS-5a. was changed to show the correct amount of vents at MH-17.

Q14: In the plan set PDF, sheet MP-6.1 is missing. Instead, an additional copy of MS-6.1 has been included in the middle of the MP sheets, contrary to the index found on sheet G0.0.
   A14: MP-6.1 has been included. See attached.

**The following questions were submitted for response by Rodan Builders, Inc.:**

Q1: S4.1 Does the 4’ single swing gate have an 8” post as a receiving latch post?
   A1: Yes per schedule on detail 5/AS-5.1

Q2: Is the framework and posts to be black powder coat or vinyl coated?
   A2: Fabric to be PVC coated per 4/AS-5.1. Post to be galvanized and vinyl coated.

Q3: AP5.2 is the fabric to be 1” mesh only, there is no 1” mesh with slats.
   A3: The fabric is to be 1” mesh, and the fence will have no slats.

Q4: What heights are the gates to be?
   A4: 8 feet unless noted otherwise. Note the chain link fencing to occur above the gate. See AP-1.1

Q5: Assume fence posts to be installed, concrete slab poured then framework, fence and gates installed.
   A5: As per constructability means and methods.

Q6: What are the locking mechanisms for the gates?
   A6: See 3/AS-5.1. Coordinate lock with campus and PG&E for lock type. Preferable to have the latch accept two different padlocks.

Q7: S-4.1-ALT - Does the Alternate only call for chain link gates? Is there chain link between the concrete wall between gates?
   A7: The alternate also includes shotcrete concrete wall, door assembly, wall footings with mat slab, chain link fencing, etc. See other drawings for additional information

**The following questions were submitted for response by Environmental Systems, Inc.:**

Q1: I believe there may be an oversite on this portion of the specification Section 23 09 23, Direct Digital Controls, 1.5 Approved Control System Contractors. We are a local Delta Controls contractor and our team has installed and serviced the Delta Control system on many projects at various campus sites. To avoid confusion and disruption of the bid, would you please notify Salas O'Brien to insert our Company name in the attached page of the specification? I highlighted the paragraph for ease of location.
A1: The specifications were changed, and EMCOR is not the only company that can install the DELTA controls system.

The original Bid Documents are updated by the information as follows:

CHANGES TO THE PROJECT MANUAL:
SECTION 00010 - TABLE OF CONTENTS
   A. Replace section in its entirety (see attached).

SECTION 00400 - BID FORM PARAGRAPH 4
Original:

All Bid items, including lump sums and unit prices, must be filled in completely. Bid items are described in Section 01100 (Summary of Work). Quote in figures only, unless words are specifically requested.

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<th>ITEM</th>
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| TOTAL BID PRICE | $     |

Total Bid Price: ________________________________________________________________ (Words)

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<td>Alternate No. 2</td>
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Changed To:

All Bid items, including lump sums and unit prices, must be filled in completely. Bid items are described in Section 01100 (Summary of Work). Quote in figures only, unless words are specifically requested.
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<td>3.</td>
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Total Bid Price: ____________________________________________ (Words)

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<th>Alternate No. 1</th>
<th>Concrete wall instead of Chain link fencing at cooling tower yard.</th>
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<tr>
<td>Alternate No. 2</td>
<td>Chiller #3 including associated piping, appurtenances, and controls.</td>
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**SECTION 00730 – SMALL LOCAL BUSINESS ENTERPRISE and SMALL EMERGING LOCAL BUSINESS ENTERPRISE PROGRAM**

A. Add new section (see attached).

**SECTION 00810 – ENVIRONMENTALLY SUSTAINABLE PROCUREMENT – CONSTRUCTION**

A. Add new section (see attached).

**SECTION 23 09 23 - DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC PARAGRAPH 1.06.A**

**Original:**
The base bid shall be Delta Controls, installed by EMCOR Services / Mesa Energy Systems Inc. Delta controls is the only acceptable controls manufacture to meet the standards of the existing system.

**Changed To:**
The base bid shall be Delta Controls. Delta controls is the only acceptable controls manufacture to meet the standards of the existing system.
SECTION 28 35 00 – REFRIGERANT MONITORING SYSTEM
   A. Replace section in its entirety (see attached).

SECTION 33 71 19 – ELECTRICAL UNDERGROUND DUCTS AND MANHOLES
   A. Delete section in its entirety.

CHANGES TO THE DRAWINGS:

AS2.2 BLDG-E EAST ELEVATION ARCHITECTURAL
   A. Continuation reference in detail 4 was changed from MP-1.4 to AP-1.4.

AS5.1 – DETAILS ARCHITECTURAL
   A. Added Detail #7 – Steel Frame at New Door Opening in Conc. Wall.

SHEET MP6.1 - SCHEDULES MECHANICAL
   A. Add new sheet (see attached).

SHEET MS-5.3 – DETAILS MECHANICAL
   A. PS-2 was changed to PS-1 on the plan view of details 1, 3, and 4.
   B. Two Manual Air Vents were added to piping shown in detail 3.

All other terms and conditions of BID No. 12/13-03 to remain the same.
PERALTA COMMUNITY COLLEGE DISTRICT
CHW INFRASTRUCTURE PROJECT
REQUEST FOR INFORMATION NO.: ______

SCHEDULE ACTIVITY ID #: ___________________________ DATE REQUESTED: ___________________________

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<th>TRANSMITTAL RECORD</th>
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<th>DATE SENT</th>
<th>DATE REC'D</th>
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| SUBJECT REF: | CONSTRUCTION MGR. TO REVIEWER | | | | |
| DRAWING REF: | REVIEWER TO CONSULTANT(S) | | | | |
| SPEC. REF: | CONSULTANT(S) TO REVIEWER | | | | |

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INFORMATION NEEDED: ___________________________

POTENTIAL IMPACT CODE:

1. SCHEDULE
2. COST
3. CHANGE ORDER
4. NO IMPACT
5. OTHER

DATE: ___________________________ SIGNATURE: ___________________________________________________

REPLY:

DATE: ___________________________ SIGNATURE: ___________________________________________________

Reviewer
Title & Organization: ___________________________________________________

You are authorized to proceed with the work identified in the reply to this RFI on the basis that no change in the contract amount or completion date is required. If the RFI reply involves a change in the work affecting your contract amount or completion date, notify the CM immediately.

DISTRIBUTION: Contractor ☐ File ☐ Field ☐ PCCD ☐ Other: ____________________________
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END OF DOCUMENT
SMALL LOCAL BUSINESS ENTERPRISE and  
SMALL EMERGING LOCAL BUSINESS ENTERPRISE PROGRAM

The District is committed to ensure equal opportunity and equitable treatment in awarding and managing its public contracts and has established an annual overall program goal of twenty-five percent participation for small local businesses. To facilitate opportunities for small local business, the District will use a maximum 5% bidding preference for SLBE and SELBE firms. The preference is only used for computation purposes to determine the winning bidder, the contract is awarded at the actual bid amount. Please review the following guidelines to see if your firm qualifies for the preference.

The 5% bidding preference for an SLBE and SELBE firms are for construction, personal and professional services, goods and services, maintenance, repairs, and operations where responsibility and quality are equal. The preference will be 5% of the bid amount of the lowest responsive responsible bidder, and may not exceed $50,000.00 for any bid.

A Non-SLBE/SELBE Prime Contractor who utilizes 25% of total bid amount, with SLBE or SELBE subcontractors (who meet the District's Definition of an SLBE and SELBE), can also receive a maximum of 4% bidding preference, not to exceed $50,000.00 for any bid. (See below Subcontractors section.)

Definitions:

SLBE: A Small Local Business Enterprise is a business that has not exceeded gross annual revenue of 8.5 million dollars for a construction firm, or 6 million dollars for goods and non-professional services firm, or 3 million dollars for architecture, engineering and professional services firm, for the past three consecutive years and meets the below geographic location requirements.

SELBE: A Small Local Emerging Business Enterprise is a business that has not exceeded gross annual revenue of 1.5 million dollars for the past three consecutive years and meets the below geographic location requirements.

Commercially Useful Function: Shall mean a business is directly responsible for providing the materials, equipment, supplies or services to the District as required by the contract solicitation. The business performs work that is normal for its business services and carries out its obligation by actually performing, managing, or supervising the work involved. The business is not Commercially Useful if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of SLBE or SELBE participation.

Geographic Location Requirements:

- The business must be located at a fixed, established commercial address located in the District’s market area of Albany, Alameda, Berkeley, Emeryville, Oakland, or Piedmont, and not a temporary or movable office, a post office box, or a telephone answering service.

- If the business has an office outside of the District’s market area as well as an office within the market area, the office within the District’s market area must be staffed on a full time permanent basis with someone employed by the business.

- If requested, the business that has an office outside of the District’s market area must provide proof of one or more past contracts citing the business address (such as contracts to perform work, to rent space or equipment, or for other business services) was within the District’s market area at least one (1) year prior to the date of contract award. The one-year requirement does not apply to businesses whose sole establishment is located within the District’s market area.
Subcontractors:

Non-SLBE/SELBE Prime Contractors who use subcontractors, who meet the district definitions of SLBE and SELBE, may receive a maximum of 4% bidding preference if the following conditions are met:

1. 25% of total bid amount is with Subcontractors who meet the District’s definition of an SLBE and SELBE. The Prime Contractor must list each Subcontractor on the Subcontractor List form, clearly identifying the SLBE and SELBE status and the Dollar Amount of work each subcontractor will perform.

2. The Subcontractors must provide a Commercially Useful Function.

3. The Prime Contractor must maintain the Subcontractor percentages (based on the quoted dollar amounts) indicated in the Subcontractor List form at the time the Contract is awarded and throughout the term of the Contract.

4. The Prime Contractor must fill out sign the SLBE/SELBE Self Certification Affidavit and return it with the bid documents, and 48 hours after the bid opening the Prime Contractor must submit signed SLBE/SELBE Self Certification Affidavit from each of the SLBE and SELBE subcontractors listed in the Subcontractor form. The Subcontractor must agree to provide the requested documentation to verify the SLBE/SELBE status.

5. No Substitutions can be made to the SLBE and SELBE subcontractor without the prior written approval of the District. The District will approve a subcontractor substitution on the following conditions:
   a. A written statement from the subcontractor agreeing to the substitution.
   b. When the subcontractor has been given a reasonable opportunity to execute the subcontract, yet fails to, or refuses to execute the subcontract, or refuses to satisfy contractual obligations.
   c. When the subcontractor becomes insolvent.
   d. When the District determines the work performed by the subcontractor is not in accordance with the contact agreement, or the subcontractor is substantially and unduly delaying or disrupting the progress of work.

Firms that meet the District criteria for an SLBE and SELBE can complete the below self-certification affidavit signed under penalty of perjury. Firms claiming SLBE and SELBE status in the self-certification affidavit will be required to submit proof of residency and revenue 48 hours after bid opening. Such proof shall consist of a copy of a contract to perform work, to rent space or equipment, or for other business services, executed from their local address, and the firm’s tax returns for the past three consecutive years.
SLBE/SELBE SELF CERTIFICATION AFFIDAVIT

I certify under penalty of perjury that my firm meets the District’s definition of a Small Local Business Enterprise or a Small Emerging Local Business Enterprise and resides in the geographic location of the District’s market area and qualifies for the below preference. The maximum preference will be five percent of the bid amount of the lowest responsible bidder, and may not exceed $50,000.00 for any bid. The preference is only used for computation purposes to determine the winning bidder; the contract is awarded at the actual bid amount. The District’s Contract Compliance Office will determine whether this requirement has been fulfilled. Bidders may only claim one of the below preferences.

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<tr>
<td>SELBE</td>
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<tr>
<td>25% of Subcontractors are</td>
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1. I acknowledge and am hereby advised that upon a finding of perjury with the claims made in this self certification affidavit the District is authorized to impose penalties which may include any of the following:

   a) Refusal to certify the award of a contract
   b) Suspension of a contract
   c) Withholding of funds
   d) Revision of a contract for material breach of contract
   e) Disqualification of my firm from eligibility for providing goods and services to the Peralta Community College District for a period not to exceed five (5) years

2. I acknowledge and have been advised and hereby agree that my firm will be required to provide proof (and if applicable, my SLBE and SELBE Subcontractors will provide proof) of the status claimed on this self-certification affidavit 48 hours after bid opening. Proof of status claimed includes tax returns from the previous three years and past contracts to determine the size and geographical location of my firm.

3. I declare that the above provisions are attested to under penalty of perjury under the laws of the State of California.

Bid Number: __________________  Bid Name: __________________

Signed ____________________________________________________________

Date __________________

Printed or typed name _____________________________________________

Title __________________________________________

Name of Company __________________  Telephone __________________ Fax __________________

Small Local Business Enterprise and Emerging Enterprise Program 00730
Peralta Community College District

VENDOR'S QUESTIONNAIRE AND CERTIFICATE BY COMPLIANCE

The following information is requested for information purposes only. It will not be used in determining bid award.

Date

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<tr>
<th>Firm Name</th>
<th>Telephone</th>
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Business Fax   Email Address   Website

Street Address   City/State   Zip Code + 4®

Mailing Address   City/State   Zip Code + 4®

Type of Organization (Check one)  Individual  Partnership  Corporation

Name of Owner(s)   State of Incorporation (if applicable)

Name of Partners   (I) Indicate  (G) General  (L) Limited

Local Address

Amount of Annual Business

The District is identifying vendor ownership as follows:

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<th>Asian-American (Chinese, Japanese, Korean, Vietnamese)</th>
<th>Black or African-American</th>
<th>Filipino</th>
<th>Latino (other than Mexican or Mexican-American)</th>
<th>Mexican or Mexican-American</th>
<th>Native American</th>
<th>Pacific Islander, other Asian</th>
<th>White</th>
<th>Disabled</th>
<th>Veteran</th>
<th>Women</th>
<th>Subcontractor</th>
<th>Employee</th>
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The District is identifying vendor workforce as follows:

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Explain whether current workforce is racially and ethnically proportionate to the area from which the workforce is drawn (national, state, or local). Use separate sheet if necessary.

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<th>Name and list residential zip code for each employee, subcontractor, or apprentice for awarded contract</th>
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ENVIRONMENTALLY SUSTAINABLE PROCUREMENT—CONSTRUCTION

It is the policy of the Peralta Community College District (Board Policy 2.40, Environmental Sustainability), to purchase products or services that help to minimize the adverse effects on human health and the environment, when compared to other products and services that serve the same purpose with comparable efficacy. The District recognizes that environmentally responsible purchasing will help create and sustain markets for environmentally sustainable products, and is committed to encouraging the procurement of products with high recycled content, FSC certified lumber, Energy Star rated equipment, low and no VOC paints, low-toxicity cleaning supplies and Green Seal approved chemicals, and will promote contracting with businesses in close proximity, to reduce our carbon footprint and to promote the District’s SLBE program.

For Operation and Construction services the District is committed to:
- **Utilizing LEED (Leadership in Energy and Environmental Design) or equivalent certification criteria as follows:**
  - All new building projects shall qualify for at least LEED NC Silver certification and shall strive for higher levels of certification, especially where overall long-term building operations, student learning, and worker productivity savings can be realized through doing so.
  - All renovation projects over 10,000 square feet shall meet basic "LEED Existing Building" certification standards.
- Maximizing energy efficiency throughout the District, in particular, heating, cooling, lighting, information technology, mechanical, and water systems. It is the goal of the District to reduce dramatically our energy consumption for existing buildings and for all new buildings to exceed the State of California Building Code Title 24 energy efficiency requirements by no less than 35%.
- Reduction of water consumption for all uses, including for irrigation and domestic purposes.
- Waste source reduction and the re-use of materials. The District encourages all contractors to re-use and recycle as much construction and demolition debris as possible, and only when it is not feasible to do so, dispose of it in a landfill. All contractors must adhere to the District’s Construction Debris Reporting Requirements.
- Sustainable landscaping and grounds design, construction and maintenance practices which promote integrated pest management and use of drought tolerant, fire safe, and native vegetation types.

All public work projects must adhere to the District Environmental Sustainability Policy 2.40. The formal policy is available for download at www.peralta.edu; click on the District Services Center tab and then Purchasing to view the environmentally sustainable purchasing policy.

**Signature**
I acknowledge and agree to adhere to the District’s Environmental Sustainability policy.

Contractor Name: ___________________________ Title: ___________________________

Authorized Signature: ___________________________ Date: ___________________________
SECTION 28 35 00
REFRIGERANT MONITORING SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Refrigerant Monitoring Systems (RMS).

1.02 REFERENCES
A. ASHRAE Standard 15/34 - 2007
B. EPA Standard 608 CFR
C. NFPA 70 - National Electrical Code.
D. NFPA 72 - National Fire Alarm Code
E. 2010 California Mechanical Code, Chapter 11
F. 2010 California Fire Code, Section 606

1.03 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Provide catalog cut sheets describing system, indicating accuracies, minimum detectable quantities of various refrigerants, data outputs, dimensions, contact ratings, capabilities.
C. Provide catalog cut sheets of components for use in the RMS, UPS, General Alarm Panel and EF Emergency Control Panel. These shall include the enclosures, pushbuttons, indicating lamps, relays and terminal strips. Clearly indicate all optional or ‘extra’ items/features to be included (expansion modules, communication modules, battery modules, etc.)
D. Provide complete shop drawings for the RMS, UPS, General Alarm Panel, Batteries, and EF Emergency Control Panel, indicating point to point wiring diagrams, component layout and lettering to be provided. Include in shop drawings all interface connections to building control system (EMS, BAS, etc), as well as all connections to building Fire Alarm panel.
E. Provide Electrical Specification for RMS Panel, General Alarm Panel, UPS and batteries, and EF Emergency Control Panels. At a minimum, provide input power, voltage, and loads under standby and alarm conditions. Provide sizing calculations for UPS, UPS supplemental batteries and General Alarm Panel batteries.
F. Provide cutsheets for horns, strobes, and breakglass pullstations. Submit nameplate list and breakglass pullstation labeling for review.
G. Provide manufacturer's information on signage to be provided, including size of sign, verbiage, text size, and text and background colors.

1.04 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.
C. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

1.05 DELIVERY, STORAGE, AND PROTECTION
A. In accordance with SECTION 01 60 00, PRODUCT REQUIREMENTS.
B. Deliver All products under this Section to project site in sealed protective packaging.
C. Store all products under this Section under cover and elevated above grade.

1.06 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a one year period after Date of Substantial Completion.

1.07 EXTRA MATERIALS
A. See Section 01 60 00 - Product Requirements, for additional provisions.
B. Supply three zero air filters and pickup filter (for each location) elements for District's use in maintenance of project.
C. Supply six replacement breakglass rods for each pullstation installed.

1.08 INSTRUCTION
A. Contractor shall furnish and coordinate instruction for the District's Maintenance personnel. Provide a minimum of 4 hours training for 5 operators. Provide instruction on normal operation and maintenance, including zero filter replacement. Provide instruction for alarm functions, silence, reset and fault sequences. Provide instruction on EF emergency control panel. Provide instructions for fault diagnostics. Provide instructions for periodic testing requirements as required by the manufacturer and code.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. OI Analytical SAM--MAX
B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS
A. Refrigerant Monitor - SAM IV MAX
   1. SAM IV MAX as manufactured by OI Analytical or approved equal. Four sampling ports with zero calibration port and filter. Sequential sampling of ports, with up to 3 different refrigerant detectors (one per port). Three (3) alarm setpoints per port to trigger notification system and initiate system actions. Expandable to eleven ports with either a four port or an eight port expansion module.
   2. Gas Detection System
      a. The system shall be capable of detecting the presence of the specific CFC, HCFC, HFC, or ammonia refrigerant regardless of which chiller/refrigerant system is selected (i.e., R-11, R-12, R-22, R-123, R-134a, etc.). The system shall be capable of providing outputs to provide indicating, alarming, initiating emergency purge vent as specified below and in governing regulations.
      b. Sequential sampling multipoint monitoring shall be employed where specified. Multiple chiller/refrigerant system applications shall be capable of being monitored (up to three separate refrigerants) with a single gas detection system.
   3. Refrigerant Monitor Panel and Equipment
      a. Analyzer: The analyzer shall be microprocessor-based and employ pyroelectric infrared (PIR) sensor technology, which is not sensitive to vibration and therefore requires no field calibration for startup or for operation in the first year. This compound-specific monitor shall alarm to the target gas only and shall not sense, display, or false alarm to any interfering gases. The analyzer and sensor shall be compound specific and/or monitor multiple compounds, and be calibrated for either refrigerant R-11, R-12, R-114, R-22, R-500, R-123, R-134a, or other as required by the approved chiller system. The monitor's target gas or refrigerant shall be capable of being switched at a future date to another refrigerant type by changing one part and recalibrating (e.g., CFC-11 to HCFC-123, etc.). Autozero calibration can be initiated at one hour intervals (adjustable), or manually, with an uncontaminated air source. Sensor response time shall be no longer than 20 seconds to a 90% step change.
         1) Accuracy:
            (a) The analyzer shall accurately sense down to one part per million (ppm) with ± 2 ppm accuracy from 0-100 ppm and +/- 5% of reading from 101 to 1000 ppm.
2) Reproducibility:
   (a) 1 ppm over a 12 month period.

b. Display: Provide an alphanumeric backlit LCD display with ½" characters, low-energy-level type, easily visible across a darkened mechanical room. The display shall automatically scroll all ppm concentration levels for each sample point and alternately scroll and display any alarm or malfunction messages without operator initiated keypad intervention. The alarm display shall alternately emit a sound and define each alarm by sample point zone number and specific alarm level.

c. Diagnostics: Provide self-diagnostics with an onboard malfunction data log and a malfunction contact for building automation system (BAS) annunciation. Display flow loss of sample or ZERO line and analytical or electrical malfunctions.

d. Alarms: Provide three adjustable gas concentration level alarms for each sample point with three common alarm output contacts. The monitor shall accurately analyze, display, and alarm in the range of 0–15 ppm for any refrigerant.

e. Sample Pump System: The system shall include a built-in sample pump for continuous sample draw and a differential pressure switch for low flow indication. The sample line limit shall not be less than 500 feet each, excluding exhaust tubing.

f. Sequential Sampling System: A single or four-point sequential sampling system shall be integrated into one analyzer enclosure. The microprocessor shall sequentially control required flow valves, coordinate signals to/from multiple remote sampling locations, continually display ppm values of all infrared sensor points, and control the sampling assembly. The system shall have individually-adjustable sample times and alarm levels for each point. The monitor shall have add on sample point expansion modules where required for future expansion. The system shall provide the number of sampling points as shown on the drawings.

g. Enclosure: The system shall have a NEMA-4 wall mount enclosure with no external keypads for tampering. The internal power supply shall be U.L.-approved, have an on/off switch/circuit breaker, and require no more than 75 watts (main unit and expansion units combined).

h. Alarms and Other Outputs: Provide four separate 4–20 mA DC analog outputs, and an RS-485 output of refrigerant level(s) for input into direct digital control (DDC) or building automation system (BAS) for centralized facility data logging and trending. Provide dry alarm contacts, rated 5 A/120 VAC, for each of three alarm levels to control alarm devices and purge vent fans, and for interface to the BAS. Setpoints programmable for each port. Contacts shall be field selectable: NO/NC and latched (manual reset)/nonlatched (auto reset).

i. Additional Features to be Provided:
1) Windows based interface software

j. Commissioning and Startup: The unit must be factory calibrated. No field calibration is acceptable at time of installation. See Part 3 of this Section for Testing and Demonstration requirements.

k. Maintenance and Calibration: No calibration shall be required for a one year from the date of shipment. A zero filter and end-of-line filters shall be included with the initial system and should be replaced every three to six months or sooner based on usage.

l. Pick Up Filters: Filters at each monitoring location shall be 0.1 micron particulate/coalescent filters furnished by the monitor manufacturer. Provide one filter per monitoring pick up location. See Spare Parts Article for additional requirements.

B. ALARM HORN: Remote signaling devices shall be suitable for flush or surface mounting to standard outlet or junction boxes. Provide nameplate "R-134a - REFRIGERANT ALARM" at all locations. Engraved lamicoid signs shall be posted at all horn locations. Outside chiller room: "DO NOT ENTER WHEN HORN IS SOUNDING"; inside the chiller room: "LEAVE AREA IMMEDIATELY WHEN HORN IS SOUNDING". Letters shall be a minimum of 1 inches high, white, with red background. Horns shall be have variable tone settings. Device color shall not be red and shall be distinct from facility fire alarm horn/strobes. Provide weatherproof backbox...
for exterior installation. Horns shall have silenceable feature or be wired so that horns may be silenced. As specified on drawings.

C. ALARM STROBE: Remote signaling devices shall be suitable for flush or surface mounting to standard outlet or junction boxes. Engraved lamicoid signs shall be posted at all strobe locations. "R-134a - REFRIGERANT ALARM". Outside chiller room: "DO NOT ENTER WHEN LIGHT IS ON"; inside the chiller room: "LEAVE AREA IMMEDIATELY WHEN LIGHT IS ON". Letters shall be a minimum of 1 inches high, white, with red background. Device color shall not be red and shall be distinct from facility fire alarm horn/strobes. Provide weatherproof backbox for exterior installation. As specified on drawings.

D. ALARM HORN/STROBE: Remote signaling devices shall be weatherproof and suitable for flush or surface mounting to standard outlet or junction boxes. Provide nameplate "R-134a - REFRIGERANT ALARM". Engraved lamicoid signs shall be posted at all horn/strobe alarm locations. Outside chiller room: "DO NOT ENTER WHEN LIGHT IS ON"; inside the chiller room: "LEAVE AREA IMMEDIATELY WHEN LIGHT IS ON". Letters shall be a minimum of 1 inches high, white, with red background. Horns and horn/strobes shall be as further specified on Drawings. Color shall not be red and shall be distinct from facility fire alarm horn/strobes.

E. BREAKGLASS PUSHBUTTONS: For manual initialization of emergency shutdown of equipment and for manual initiation of fan purge sequence. Pushbuttons shall be as specified on the Drawings. Color shall not be red and shall be distinct from facility fire alarm pull stations. Provide nameplate similar to alarm devices stating "EMERGENCY STOP" AND "EMERGENCY EXHAUST FAN PURGE", respectively.

F. REFRIGERANT MONITORING SYSTEM GENERAL ALARM PANEL: General alarm panel shall be utilized to power horns and strobes and shall have battery backup 24 VDC, with accessories and modules as specified on the drawings. Panel shall provide full supervision of signaling devices and refrigerant monitoring system and shall provide "trouble" inputs to the facility fire alarm system for remote monitoring. Units specified on drawings are typical small fire alarm panels and shall be repainted a color other than red prior to installation.

G. UPS and BATTERIES: APC or approved equal, shall provide continuous AC power to the refrigerant monitor. Provide the unit with the capacity and extra batteries as specified on the drawings. Batteries & UPS sized for 24 hours of monitoring, and 5 minutes of alarming. Mount equipment off of the floor.

H. FAN EMERGENCY CONTROL: Contractor fabricated NEMA IV, painted enclosure with break glass front and locking hinged cover. Provide oil tight pushbuttons for emergency control of exhaust fans. Provide indicating lights as shown and mount in panel. Label all components.

I. SAMPLE TUBING: The tubing shall be refrigerant-grade copper, ¼" O.D. seamless Type ACR (hard or annealed) complying with ASTM-B280 or seamless Type K, L, or M (drawn or annealed) in accordance with ASTM-B88, with compression fittings. Soldered or brazed connections are not acceptable due to foreign gases and contaminants. Poly tubing and other gas absorbing/leaching types are unacceptable due to sample corruption. Nylon nonplasticized ¼" O.D. tubing, similar to Parker Hannifin, may be used if preapproved, and installed or bundled in ¾" EMT conduit, or larger, 80% free area. The tubing shall be shipped sealed to the site.

PART 3 EXECUTION

3.01 CALIBRATION

A. Unit shall be factory calibrated. This includes a zero calibration, as well as a minimum of two additional points using calibration gases of known concentrations

3.02 MANUFACTURERS DIRECTIONS

A. Follow in all cases where manufacturers of articles used furnish directions covering points not specified or shown. Equipment which is required to be field assembled shall be assembled under the direct supervision of the manufacturer.
3.03 EQUIPMENT
A. Accurately set and leveled with supports neatly placed and properly fastened. Properly fasten equipment in place with bolts or clips as shown on drawings to prevent movement in earthquake. No allowance of any kind will be made for negligence on part of Contractor to foresee means of bringing in or installing equipment into position in or on the building and for adequate anchoring of equipment.
B. Mount monitor panel and refrigerant monitoring pick ups outside of any directed airstream from air outlets or inlets, motor vents, etc.
C. Refrigerant Sensing Piping: Install ¼” O.D. tubing to each monitored zone. Connections shall be mechanical compression fittings. Pressure test installed tubing with 15 psig air. Tubing shall be worked into a complete, integrated arrangement with like elements to make work neat appearing, and finished. Where exposed, parallel with walls or structural elements; vertical runs plumb; horizontal runs level, parallel with structure or uniformly pitched as appropriate. Terminate in utility box and provide particulate filter on end of line. Mount pick ups within 10” of floor. Provide support at less than six foot intervals and at all bends.
D. Zero and Pick Up Filters: Assemble and install zero and pick up filters as per manufacturer's instructions.
E. Exhaust port: Field route exhaust port a minimum of five feet from zero filter.
F. UPS: Mount UPS System and Batteries on concrete housekeeping pad (4” min) or mount to wall with appropriate shelves and seismic restraints.
G. Horns: Set horn tone to be distinct from fire alarm horns. Set 15 dBA above ambient sound levels. Install horns as shown on drawings.
H. Strobes: Coordinate flash rate of refrigerant strobes with fire alarm strobes if any. Total flash rate shall not exceed 300 flashes per minute. Install strobes as shown on drawings.
I. Horn/Strobes: Combination units shall be as per individual units described above. Install as shown on drawings.
J. Breakglass: Install breakglass at 48” above finish floor to the centerline of the device.
K. EF Emergency Control Panel: Wall or pedestal mount securely to resist seismic forces. Mount at 48” above floor to centerline of panel, unless otherwise noted.

3.04 SYSTEM SET UP AND PROGRAMMING
A. Coordinate with Controls Contractor for scaling and setpoints programming, relay contact normal position and interconnections to reset pushbuttons, horn silence, EF Emergency Control Panel, BAS and building Fire Alarm Control Panel. Provide latching alarm action, normally open relay contact positions, 0 2000 ppm scaling for analog outputs, and alarm levels as described in this section and as shown on the drawings. Provide written start up report verifying that all sequences and operations are as specified and required for proper operation of complete system.

3.05 SIGNS, LABELS AND IDENTIFICATION OF EQUIPMENT
A. Post warning signs at each alarm horn/strobe location. Properly identify each piece of equipment and its controls using engraved laminated plastic descriptive nameplates, black on white, fastened to equipment and controls using round head brass machine screws, pop rivets, contact cement or chain to equipment. Cardholders in any form are not acceptable.
B. Provide and post code required sign indicating installing contractor, and type and quantity of refrigerant in system as described on the drawings.

3.06 TESTING AND DEMONSTRATION:
A. Complete Refrigerant Monitoring System shall be tested and demonstrated in the presence of the Owner and Engineer to verify correct operation for all aspects of the installed system to meet the sequences and operation as specified herein and on the drawings and as required to meet code requirements.
B. Installing Contractor shall provide test gases for use in demonstrating (as well as for training as described in Part 1 of these specifications) operation of all alarm functions (lo, med and high, each refrigerant required). Installing Contractor shall provide replacement breakglass rods for replacement at the end of testing and demonstration. Demonstration shall include, but not necessarily limited to, the following:
   1. Purge fan pullstation operation.
   2. Emergency Power Off pullstation operation.
   3. Low, Medium and High Level alarm operation
   4. Horn Silence (local and remote from EF Emergency Control Panel).
   5. System reset
   6. Communication of alarms to Fire Alarm System and BAS system printer
   7. Disconnecting alarm devices to verify annunciation to Fire Alarm
   8. Disconnect power to verify battery backup operation
   10. Operation of room temperature sensor/thermostat.

C. Controls Contractor representative shall also be present during demonstration.

END OF SECTION
THESE DRAWINGS WERE PREPARED FROM EXISTING CAMPUS UTILITY DRAWINGS, NEW BUILDING ADDITION DRAWINGS AND CASUAL SITE OBSERVATIONS, WITH ACTUAL SITE SURVEY DATA INCLUDED WHERE AVAILABLE. THE ACCURACY OF THESE DRAWINGS CANNOT BE GUARANTEED. UNDERGROUND LOCATING SERVICES OR POTHOLING WILL NEED TO BE PERFORMED TO ACCURATELY LOCATE UNDERGROUND UTILITIES. COORDINATE WITH CAMPUS FOR UNDERGROUND LOCATION ACTIVITIES.
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