Department of Administrative Services
Purchasing and Contracts

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CLARK COUNTY, NEVADA
BID NO. 603469-14
DESERT BREEZE COMMUNITY CENTER PHOTOVOLTAIC & EUC SYSTEMS

October 13, 2014

ADDENDUM NO. 1

INVITATION TO BID

1. The bid opening date of October 23, 2014 at 2:15:00 p.m. **remains unchanged**.

SITE VISIT

2. A site visit has been scheduled for Tuesday, October 14, 2014 at 9:00 a.m. Meeting place will be at 8275 Spring Mountain Road Las Vegas, Nevada 89117, Main entrance of community center.

SPECIFICATIONS:

3. Specification Section 26 05 74 Overcurrent Protective Devices ARC-Flash Study **ADD; Entire section. Update to existing ARC-Flash study with labels applied to new equipment and labels replaced on existing equipment where incident energy values have changed are required; Clark County will provide existing studies for Contractor's use upon contract award.**

4. Specification Section 26 31 00 Photovoltaic Collectors, page 3, Section 2.04 SUPPORT SYSTEM, A, **REVISE; "Non-penetrating, ballasted system equivalent to Panel Claw Polar Bear III."**

5. Specification Section 26 05 33 Raceway and Boxes for Electrical Systems, page 3, Section 3.01 RACEWAY APPLICATION, A 6, **ADD; "Roof mounted conduit: Rigid Galvanized Steel."**

DRAWINGS:

6. Sheet E-601 Single Line Diagram & Load Calculations, Keynote 3, **ADD; "Locate so tap conductors comply with 10 foot tap rule, NEC 240.21 (B)(1)."**

7. Sheet E-601 Single Line Diagram & Load Calculations, Keynote 2, **REVISE; "Southwest Electritech Services or equal:**

8. Sheet E-601 Single Line Diagram & Load Calculations, Keynote 5 reference, **ADD; between Main Switchboard DP and NV Energy REC meter.**

ISSUED BY:

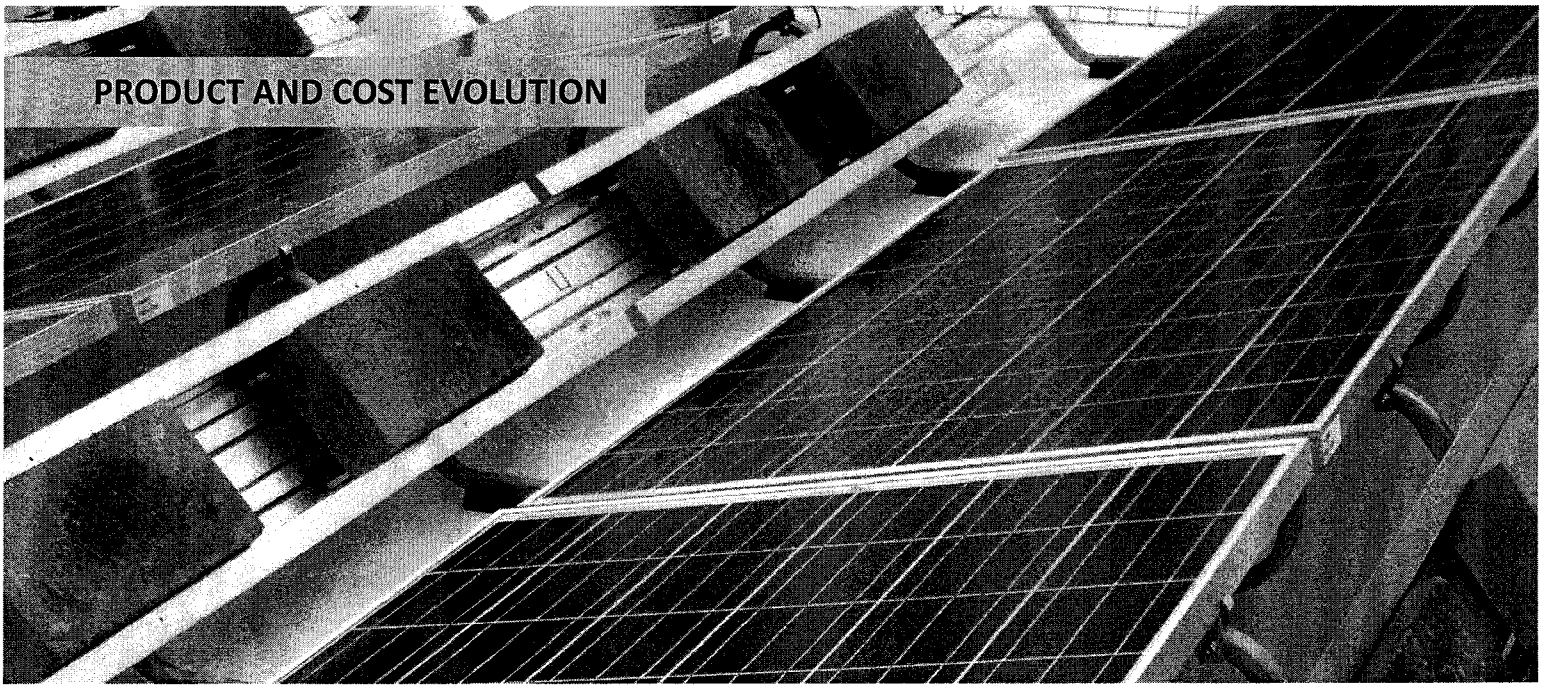
SANDY MOODY-UPTON
Purchasing Analyst II

Attachment(s): Panel Claw Polar Bear III cut sheet
Specification Section 26 05 74

Cc: Chuck James, Real Property Management
Brian Connolly, Real Property Management
Kety Allred, Real Property Management
Ann Johnson, Ann Johnson Architect

Polar Bear III

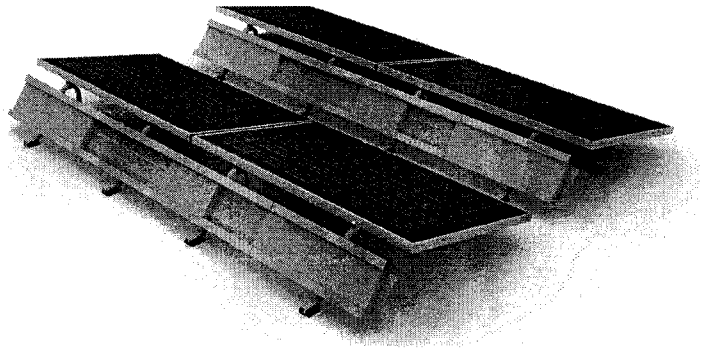
Flat Roof Mounting System



System Level Approach

Low-cost mounting components provide savings early in the project development process. However, when you are looking to lower the total installed cost, from delivery to a fully wired system, details make the difference. Polar Bear® III combines critical system features, A-to-Z project support, and long-term product reliability into a single low-cost platform. The system components, delivery, and installation procedures have been jointly designed to deliver a lower total cost and better service experience.

The new Polar Bear® takes the best features, service, and reliability from PanelClaw's earlier flat roof systems and combines them into a single platform.



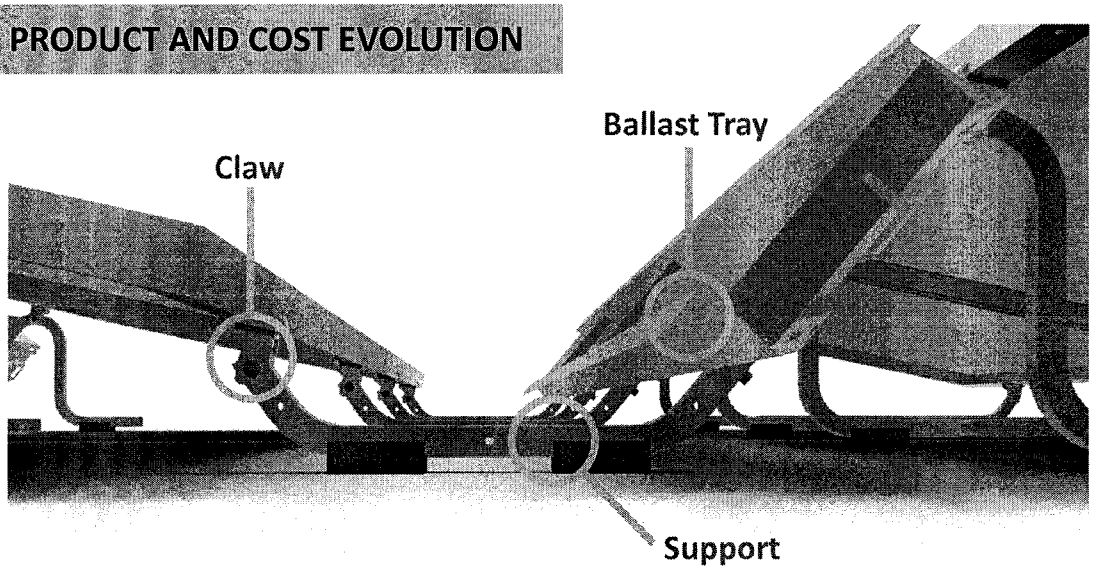
panelclaw.com

panel claw®

Polar Bear III Flat Roof Mounting System
10 Degree

panelclaw®

PRODUCT AND COST EVOLUTION



Trusted Roof Integrity
Polar Bear® III reduces potential long-term roof damage with fully captured ballast, integrated roof protection pads and a system design that allows for free water flow.

Accelerated Construction
The engineered design emphasizes built-in features to improve construction efficiencies:
- Three major components, light-weight and easy to move
- Pre-installed bolts to quickly mount Ballast Trays
- Single-module tilt-up to facilitate must-have access to roof, wiring and maintenance

Safety and Reliability
Polar Bear III is the product of PanelClaw's data-driven test program to improve PV reliability. Polar Bear III is proven technology based on hundreds of megawatts of project experience.

Three Components

Support
- Easy-to-handle components that weigh less than 2.5 pounds
- Integrated recycled rubber roof protection pads
- Pre-drilled holes for wire management cabling options

Ballast Tray
- Angled fit with locking end-tab to fully capture ballast blocks
- Hemmed edges and chamfered corners prevent wiring from coming into contact with sharp edges

Claw
- Attachment to module using standard module mounting holes
- UL 2703 certified for electric bonding and grounding

Specifications

Applications
Flat roof
(max slope 5°)
Fully ballasted or mechanically attached

Module Tilt Angle
10° nominal

Module Orientation
Landscape

Module Attachment
Standard module mounting holes

Basic Wind Speed
Up to 120 mph
(>120 mph by approval)

Wind Exposure Category
B and C
(D by approval)

Seismic Compatibility
C, D, E and F

Shading Ratio
2.3:1 and 2.7:1

Platform Load
~1.9 - 8 psf

Warranty and Certifications
25 year warranty
UL 2703 certification

(978) 688.4900 | sales@panelclaw.com

Made in USA

Printed on recycled paper

SECTION 26 05 74
OVERCURRENT PROTECTIVE DEVICE ARC-FLASH STUDY

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.
   1. There is an existing arc flash study for this facility. Clark County will provide hard copy of existing studies for Contractor's use upon contract award. The arc-flash study included with this project shall replace arc flash labels on all existing devices and new equipment added with this project.

1.02 DEFINITIONS

A. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

B. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

C. SCCR: Short-circuit current rating.

D. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.03 SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Submit the following submittals after the approval of system protective devices submittals. Submittals may be in digital form.

   1. Arc-flash study input data, including completed computer program input data sheets.
   2. Arc-flash study report;

C. Qualification Data: For Arc-Flash Study Software Developer, Arc-Flash Study Specialist and Field Adjusting Agency.
   1. Meet the requirements outlined in section 1.4 below.

D. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

E. The final report submittal for the Arc-Flash study shall meet the requirements shown in section 2.2 below.

1.04 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.

B. Arc-Flash Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. The computer program shall be developed under the charge of a licensed professional engineer or power study specialist and shall be experienced for a minimum of five (5) years in the use of the software and applications of the standards for comparable electrical distribution equipment types and sized projects or as otherwise approved by the electrical engineer of record.

C. Arc-Flash Study Specialist Qualifications: Individual in charge of performing the study, analyzing the arc flash, and documenting recommendations, shall be a, professional engineer licensed in the state where Project is located. Or power study specialist and shall be experienced for a minimum of five (5) years in the use of the software and applications of the standards for comparable electrical distribution equipment types and sized projects or as otherwise approved by the electrical engineer of record

D. Field Adjusting Agency Qualifications: An independent agency, with the experience and capability to adjust overcurrent devices and to conduct the testing indicated, that is acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 COMPUTER SOFTWARE DEVELOPERS

A. Software Developers: software developers offering software that may be used for the Work include.

1. Easy Power
2. ETAP
3. SKM Systems Analysis, Inc.
4. Power Analytics-EDSA

B. Comply with IEEE 1584 and NFPA 70E-2015.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.02 ARC-FLASH STUDY REPORT CONTENT

A. Executive summary.

B. Study descriptions, purpose, basis and scope.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Cable size and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings.
4. Motor and generator designations and kVA ratings.
5. Switchgear, switchboard, motor-control center and panelboard designations.

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study Output:
1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. Equivalent impedance.
2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. Calculated asymmetrical fault currents:
      1) Based on fault-point X/R ratio.
      2) Based on calculated symmetrical value multiplied by 1.6.
      3) Based on calculated symmetrical value multiplied by 2.7.
3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. No AC Decrement (NACD) ratio.
   e. Equivalent impedance.
   f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
   g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis

F. Protective Device Coordination Study Contents:

1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

   a. Phase and Ground Relays:
      1) Device tag.
      2) Relay current transformer ratio and tap, time dial, and instantaneous pickup value.
      3) Recommendations on improved relaying systems, if applicable.

   b. Circuit Breakers:
      1) Adjustable pickups and time delays (long time, short time, ground).
      2) Adjustable time-current characteristic.
      3) Adjustable instantaneous pickup.
      4) Recommendations on improved trip systems, if applicable.

c. Fuses: Show current rating, voltage, and class.

2. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:
   a. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
   b. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
   c. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
   d. Plot the following listed characteristic curves, as applicable:
   e. Medium-voltage equipment overcurrent relays.
   f. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.
   g. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.
   h. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
   i. Cables and conductors damage curves.
   j. Ground-fault protective devices.
   k. Motor-starting characteristics and motor damage points.
   l. Generator short-circuit decrement curve and generator damage point.
   m. Generator control system shutdown curve.
   n. The largest feeder circuit breaker in each motor-control center and panelboard.

   o. Provide adequate time margins between device characteristics such that selective operation is achieved.
   p. Use 4 terms to describe the level of selective coordination achieved. The following is a description of the intent of those terms.
      1) Good coordination: Selective coordination has been achieved as defined by NEC Article 100.
      2) Fair coordination: Selective coordination has been achieved as defined by the NEC except some devices have needed to be considered in series as allowed in the exception #1 and 2 in Article 700.27 or exception #1 and 2 in Article 701.18.
      3) Acceptable coordination: Selective coordination has been achieved as defined by the NEC except from a point between 0.00 seconds and 0.10 seconds as may be allowed by the local jurisdiction.
      4) Poor coordination: Selective coordination has not been achieved as defined by the NEC.

3. Comments and recommendations for system improvements.

G. Arc-Flash Study Output:

1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.
d. Equivalent impedance.

H. Incident Energy and Flash Protection Boundary Calculations:

1. Arcing fault magnitude.
2. Protective device clearing time.
3. Duration of arc.
4. Arc-flash boundary.
5. Working distance.
6. Incident energy.
7. Hazard risk category.
8. Approach distances..

I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of the computer printout.

2.03 ARC-FLASH WARNING LABELS

A. Labels shall be a 4-inch by 6-inch (101.6 by 152.40-mm) thermal transfer label of high-adhesion polyester for each work location included in the analysis.

B. The label shall have an orange header with the wording, "WARNING", or red header with the wording, "DANGER" and shall include the following information taken directly from the arc-flash hazard analysis:

1. Location designation.
2. Nominal voltage.
3. Flash protection boundary.
4. Hazard risk category.
5. Incident energy.
6. Working distance.
7. Limited approach distance.
8. Restricted approach distance.
9. Prohibited approach distance.
10. Insulating glove information.
11. Issue date.

C. Labels shall be machine printed, with no field-applied markings.

D. Labels shall be rated for outdoor use and direct sun light as required by NFPA 70E

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.02 ARC-FLASH HAZARD ANALYSIS

A. Comply with NFPA 70E and its Annex D for hazard analysis study.

B. Preparatory Studies:

1. Short-Circuit Study Output: As specified above.
2. Protective Device Coordination Study output: As specified above.

C. Calculate the arc-flash protection boundary and incident energy at locations in the electrical distribution system where personnel could perform work on energized parts.

D. Include all medium- and low-voltage equipment locations.

E. Safe working distances shall be specified for calculated fault locations based on the calculated arc-flash boundary, considering incident energy of 1.2 cal/sq.cm.

F. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:

1. Fault contribution from induction motors should not be considered beyond three to five cycles.
2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g., contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).

G. Arc-flash computation shall include both line and load side of a circuit breaker as follows:

1. When the circuit breaker is in a separate enclosure.
2. When the line terminals of the circuit breaker are separate from the work location.

H. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.03 POWER SYSTEM DATA

A. Obtain all data necessary for the conduct of the arc-flash hazard analysis.
1. For new equipment, use characteristics submitted under the provisions of action submittals and information submittals for this Project.
2. For existing equipment, whether or not relocated, obtain required electrical distribution system data from existing Arc Flash Study provided by County upon award of contract. The existing study was performed with ETAP 12.0 software and contains approximately 5 busses, 8 panels, and 32 protective devices.

3.04 LABELING

A. Apply one or more arc-flash label per section of equipment for each of the following locations:

1. Motor-control center.

2. Low-voltage switchboard.
3. Switchgear.
4. Medium-voltage switch.
5. Control panel.
6. Automatic transfer switches
7. Panelboards
8. Disconnects above 100 Amps

B. New arc-flash labels shall replace arc-flash labels on existing equipment where the incident energy has changed.

3.05 APPLICATION OF WARNING LABELS

A. Installation of the arc-fault warning labels shall be by the agency providing the study.

END OF SECTION