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## Walking Box Ranch Planning and Design Quarterly Progress Report: Period ending October 10, 2010

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## **QUARTERLY PROGRESS REPORT**

**University of Nevada, Las Vegas  
Period Covering July 11, 2010 – October 10, 2010**

**Financial Assistance Agreement #FAA080094**

**Planning and Design of the Walking Box Ranch Property**

### **Executive Summary**

- UNLV Public Safety is assisting in identifying security methods needed to guarantee safety and security at the ranch after project completion. This effort will involve the assistance of Metro CPTED program officers as design proceeds.
- UNLV IT is determining the extent to which they can assist with networking and technology issues as project design moves forward. They may assist in identifying consultants to hire to assist with technology.
- We have solicited research/education proposals from UNLV faculty for projects to be initiated in the coming year. The goal is to provide seed funding for projects that will expand as the facilities are built.
- PLI Educators are in the initial stages of planning teacher-training courses that can be offered at the ranch, to provide scientific and other course content for the CCSD. CCSD teachers visited the ranch for half-a-day to see currently available facilities, learn about the project, and brainstorm about future education/research partnerships.
- Work with the UNLV Foundation is continuing to facilitate contributions to the ranch from former resident Rex Bell Jr. Strategies are being developed to identify future donors to the ranch.
- The weather station continues to collect data at the ranch and work continues to expand the website to present and past collected data along with current weather information. Additional research projects utilizing this data and related to green technologies that may be incorporated into building design have recently been initiated.
- UNLV is collecting data for informational brochures that will be available to the public visiting the ranch in the future and will provide information on biology, geology, anthropology, film history and other topics relevant to the ranch and the Mojave Desert.

- Dornbusch and Associates is near completion of a draft “Visitor Services Feasibility, Compatibility, Market Study, and Business Plan” at the ranch, that will address all future museum and research center activities. This effort began in April 2010.
- Bill Wood and Paula Garrett have finalized an inventory of items that Rex Bell is considering donating or selling to UNLV for inclusion in the planned museum at Walking Box Ranch. UNLV professional photographer Geri Kodey photographed historic items in the Bell home that will probably not be available for inclusion in the museum, so that these items can be included for the historic documentation.
- UNLV is still awaiting word on a grant proposal to the Broadband Technology Opportunities Program to build, upgrade, extend, and deliver high-speed broadband Internet Connectivity to Community Anchor Institutions located throughout Clark County, Nevada, including Walking Box Ranch.

### **Summary of Attachments**

- WeatherStation Sep2010.doc

### **Planning and Design, and Construction Phase Items:**

1. ***Provide BLM with consultation and advise to assist the BLM in defining the scope of work for the design of this project. The UNLV shall coordinate with the University departments and schools and act as the academic focal point for information relative to the design of the Science and Training Center for arid land studies.***
  - UNLV faculty comprised one of the stakeholder groups identified early on during the SAT grant-funded part of the project that led to completion of the Master and Preservation Plan. Participation at this stage contributed to design features of the Center.
2. ***Participate in all phases of scoping and planning meetings and meetings with the BLM’s planners, architects, and contractors for the design and development of the Walking Box Ranch as a Science, Research, and Training Center and Museum for the study of arid lands and development of the Headquarters as a Museum and interpretive center. The UNLV’s participation is to provide input to the BLM relevant to the specific educational and research goals of the project.***
  - There were no project meetings during this period; however, UNLV participated in a project start-up conference call. Meetings that UNLV will participate in will begin immediately following this reporting period.
  - The quantity and sizes of rhyolite rock will need to be determined following project startup later this month. UNLV will work with project architects to determine the required material, and will then work with Viceroy Mining to obtain the material.

**3. Assist BLM in developing the environmental assessment by providing technical input and review of the draft environmental assessment.**

- There were no environmental assessment activities this quarter. However, UNLV is aware that the public comment period ended July 18, 2010, and UNLV will work with BLM in addressing comments from the public.

**4. Provide technical and academic advice to BLM in the development of the museum facilities, by conducting research into the historic records of the ranch and providing recommendations about the appropriate interpretive and environmental education programs that may be presented at the ranch.**

- UNLV has established a weather station at the ranch. The station collects hourly data on temperature, humidity, wind speed and direction, and insolation. The data is transmitted wirelessly to UNLV and captured and projected on the PLI-WBR website. A database of weather information will be maintained for further analysis. The overall goal is to use the weather station to conduct research at the site that contributes essential data for use of renewable technologies at the ranch. Weather stations plans also include developing a webpage that will give the user the flexibility to select and view the desired meteorological parameters in graphical or raw data format for any particular day or month or a period from the collected data. Project activities underway include the following.
  - An advanced user interface to provide additional options is being developed. This interface can be used to view the past and current meteorological information according to user preferences such as daily and monthly average radiations.
  - A dual axis tracker and pyrhelimeter solar radiation measuring device were purchased with funding obtained from the UNLV Sustainability and Multidisciplinary Research Initiative, and the Solar and Renewable Energy Minor program. The solar tracker will track available solar energy as the sun moves across the sky. The tracker and pyrhelimeter have been tested on the top of the University of Nevada, Las Vegas engineering building and are now ready for installation at the Walking Box Ranch site. Due to the pitch of the building roof where the weather station is installed, a stand is needed to mount the DNI tracker. The stand was fabricated and is ready to be installed. The tracker requires 110V power supply from the interior of the building to the rooftop, which demands conduit installations.
  - Building envelope studies, from a passive energy savings standpoint, were initiated. Building envelope components reviewed so far includes roofs, fenestration (windows & doors) and walls (insulation). We have already identified various types of roofs and roof insulations (for hot and arid climatic conditions) which can reduce the heat transfer from and to the building, which reduces heating and cooling loads experienced by air

- conditioning units. Currently, walls and fenestration are being assessed for applicability in desert type climatic conditions.
- Different types of solar water heating systems will be assessed for applicability at the Walking Box ranch. One flat plate collector type and two evacuated glass tube collector type solar water heating systems were installed on the roof of the Thomas T. Beam Engineering Complex (TBE) at UNLV campus (Las Vegas). A weather station comprising a temperature sensor, a hygrometer, an anemometer, a wind vane and a pyranometer mounted on a mast is installed along side the solar water heater collectors to measure the necessary weather parameters for the purpose of performance calculations. The data collected from the solar water heating systems will be used to evaluate their performance. A few tests designed to be run in near future are:
    - Variation in the rate of heat transfer with the variation in water flow rate.
    - Cost and heat exchange effectiveness comparisons of direct heat transfer evacuated glass tube type solar water heater and indirect heat transfer evacuated glass tube type solar water heater.
  - Net zero (electric) energy buildings at the Walking Box Ranch can be achieved by applying solar PV systems. Thus the focus of this task is to identify the most suitable PV technology/technologies for applicability at the ranch buildings. Four different types of Photovoltaic (PV) systems which include one monocrystalline silicon, one polycrystalline silicon and two different thin-film PV (flexible and non-flexible) technologies have been assembled on the same plane on the roof top of UNLV TBE building. Tests that have begun will allow the team to measure the performance characteristics of different types of PV technologies for hot-arid desert type climatic conditions. An automated data collection system has been developed, which logs the data to a notebook computer at continuous intervals. Several performance characteristics such as the I-V and temperature dependency can be obtained from the collected data.
  - See attached document **WeatherStation Sep2010.doc** for a complete update on the weather station.
  - UNLV is collecting and preparing data for informational brochures that will be available to the public at the ranch in the future and will provide information on biology (reptiles, mammals, plants), geology, anthropology, and Clara Bow and Rex Bell films, topics relevant to the ranch and the Mohave desert. We are working with B&P Advertising on design of a Walking Box Ranch brochure and presentation folder, which will be used to produce brochures and advertising documents with a professional appearance that is consistent with the ranch brand.
  - Bill Wood and Paula Garrett have completed inventories of items that Rex would like to donate or sell to UNLV for inclusion in the planned museum at Walking Box Ranch. Geri Kodey, UNLV professional photographer, also visited the Bell home and photographed significant historic items that Bell

will not donate for use at the ranch. These photographs will be displayed at the ranch and on the UNLV ranch website, and will contribute to the historic documentation.

- We have invited investigators at UNLV to submit research/education proposals to be conducted from WBR and/or in the vicinity of Piute Valley, which we hope will develop into larger initiatives in the future. We are currently awaiting receipt of these proposals.
- Approximately 20 teachers from the Clark County School District visited the ranch for a half day to learn about the ranch history and plans for future development. This information was followed by a brainstorming session to identify possible future education and/or teacher training activities that can be conducted at or using ranch facilities. The goal is to develop education/learning programs that can be continued and expanded in the future. Visit results are now being compiled.
- Jean Cline is working with Daphne Sewing and Allison Brody, PLI education experts to develop teacher training classes to be offered at the ranch during the coming year. Such classes are surprisingly absent from the Las Vegas community.
- Jean Cline is working with the UNLV Foundation to facilitate donations to the ranch from former ranch resident Rex Bell Jr. Meetings also include identifying strategies for future donations for the project from the public.

**5. *Contribute technical and educational-based assistance to the BLM for the BLM's consideration during construction development for the Science and Training Center and Museum as it relates to the future operations of these facilities as education centers.***

- UNLV Public Safety has been involved in discussions on building design to identify appropriate security needs for future operation of the ranch. The security team is now researching best approaches, which may include security cameras, alarms, lighting, and renewed involvement by Metro CPTED program officers, who are trained in incorporating security into building design.
- UNLV IT personnel are determining the extent to which they can advise on IT networking and technology, and will recommend consultants as needed.
- UNLV is still waiting to hear about an application to build high-speed broadband internet connectivity to Community Anchor Institutions, including Walking Box Ranch, which The Public Lands Institute joined as a partner with Clark County, Nevada and other partner institutions. The application for funding this work is being made through the Broadband Technology Opportunities Program, which is administered by the U.S. Department of Commerce. This expansion of Middle Mile infrastructure will provide an opportunity for high-speed data services to the Walking Box Ranch project.

**6. *Provide input and feedback to the BLM during the construction of the Field Research and Training Center and the Museum.***

- The project is not under construction at this time.

### **Phase 1 Deliverables:**

**1. Provide a Facility and Future Needs Alignment Report that will identify the types of future research and training programs that will be conducted at Walking Box Ranch Field Research and Training Center and Museum. The report will also include a matrix that aligns predicted future activities with facility, construction, furnishing, and equipment needs.**

- This report will be prepared following receipt of the business plan, that will contribute to identifying future activities and equipment needs.

**2. Assist the BLM in developing a Preservation Plan for Existing Structures on the Headquarters Parcel of the Walking Box Ranch.**

- This process will resume as the next project phase – production of architectural and engineering drawings – begins later this month.

**3. Provide a Business Plan detailing anticipated future research, training, and other use goals and a financial plan for reaching those goals. The Business Plan should also describe income and operations and maintenance costs.**

- UNLV contracted with Dornbusch and Associates in April 2010 to provide a business plan; UNLV anticipate having a draft report by the end of October 2010.

### **Phase 2 Deliverables:**

**1. Prepare a Project Development Plan that reflects UNLV's Business Plan. The Project Development Plan should refine the anticipated research, residential training activities, and Museum use; identify recommended new facilities and renovations; outline construction; and plan center management (print and PDF).**

- The project development plan will be completed following receipt of the business plan.

**2. Assist the BLM in creating a detailed Work Plans for each aspect of project development such as, but not limited to, existing building use, new construction, interpretive programs, and center management, based upon the Comprehensive Master Plan and Preservation Plan.**

- Assistance will resume following project start-up later this month.

### **Phase 3 Deliverables:**

- 1. Assist in the development of Facilities Design Drawings according to the recommendations of the Comprehensive Master Plan generated by the SAT project, in conformance with existing significant architectural features and historical attributes of the property, in a fashion responsive to LEED goals to the extent funding permits, and to meet all property easements.***
  - Assistance will resume following project start-up later this month.
- 2. Assist in the development of Facilities Design Drawings for the preservation of facilities according to the recommendations of the Comprehensive Master Plan and Preservation Plan in conformance with historical and architectural attributes of the buildings and property, and to meet all property easements.***
  - Assistance will resume following project start-up later this month.

### **Phase 4 Deliverables (During Construction):**

- 1. Provide the BLM consultation and advice during construction to help the BLM ensure the construction meets the goals of the project.***
  - The project is not under construction at this time.
- 2. Provide the BLM consultation and advice as needed during renovation of preserved facilities, to help the BLM ensure that the renovation meets goals of projects and is in accordance with historical restoration requirements and according to approved designs.***
  - The project is not under construction at this time.

### **Phase 5 Deliverables:**

- 1. Assess and identify furnishings and equipment based upon facility needs; provide the BLM information related to furnishings and equipment for new and preserved facilities so that the BLM can procure these items, within project funding under this Cooperative Assistance Agreement. The UNLV may provide additional furnishings and equipment outside of this Agreement at the UNLV's sole discretion.***
  - While we are not acquiring furnishings at this time, we are continuing to work with Rex Bell Jr. about his desire to see original ranch furnishings now in his possession returned to the ranch. For further details see the third item under Task 4 above.

**SUMMARY OF PROJECT PLAN**  
*Walking Box Ranch – Planning and Design*

<b>Year One Deliverables</b>	<b>Percent Complete as July 10, 2010</b>	<b>Plan for Completion</b>
<b>Planning and Design:</b>		
1. Provide BLM with consultation and advice in defining the scope of the design of the Science and Training Center.	40%	Continue to consult and advise BLM in the scope of design of the training center.
2. Participate in all phases of scoping and planning team meetings for the design and development of WBR as a Science, Research, and Training Center and Museum.	40%	Continue to participate in scoping and planning of the Museum and the training center.
3. Assist BLM in developing the environmental assessment process with technical input and review of drafts.	65%	Continue to work with EDAW and BLM on the Environmental Assessment process, scheduled to be complete later summer/early fall 2009, but now delayed until 2010.
4. Provide technical and academic advice to BLM in development of the museum facilities with recommendations of interpretive and environmental programs for presentation at the Ranch.	40%	Continue to provide technical and academic advice for interpretive and environmental programs.
5. Contribute technical and educational-based assistance to the BLM for the BLM's consideration during construction development for the Science and Training Center and Museum as it relates to the future operations of these facilities as education centers.	40%	Continue to contribute technical and educational-based assistance to the BLM for the Science and Training Center and Museum.
6. Provide input and feedback to BLM during the construction of Field Research and Training Center and the Museum.	0%	Project is not under construction.
<b>Phase 1 Deliverables:</b>		
1. Provide a Facility and Future Needs Alignment Report that will identify the types of	20%	Work with faculty at UNLV to identify future research and

future research and training programs that will be conducted at Walking Box.		training programs and incorporate in report. This will be completed in 2010 in conjunction with a business plan.
2. Assist the BLM in developing a Preservation Plan for Existing Structures on the Headquarters Parcel of the Walking Box Ranch.	40%	Work with BLM and ARG architects to develop preservation for existing structures.
3. Provide a Business Plan detailing anticipated future research, training, and other use goals and a financial plan for reaching those goals.	50%	Obtain a detailed business plan that builds on the preliminary building plan prepared by Dornbusch and Associates in 2009-10. This will be accomplished in 2010.
<b>Phase 2 Deliverables:</b>		
1. Prepare a Project Development Plan that reflects UNLV's Business Plan. The Project Development Plan should refine the anticipated research, residential training activities, and Museum use.	0%	This will begin after a business plan is developed.
2. Assist the BLM in creating a detailed Work Plans for each aspect of project development based upon the comprehensive master plan and preservation plan.	0%	This will begin as the project progress resumes.
<b>Phase 3 Deliverables:</b>		
1. Assist in the development of Facilities Design Drawings according to recommendations of the comprehensive master plan generated by the SAT projects.	40%	We will continue to work with BLM, AECOM and AECOM subcontractors to assist with design of the facilities.
2. Assist in the development of facilities design drawings for the preservation of facilities according to the recommendations of the Comprehensive Master Plan and Preservation Plan.	40%	We will continue to work with BLM, AECOM and AECOM subcontractors to assist with design of the facilities.
<b>Phase 4 Deliverables (During Construction):</b>		
1. Provide the BLM consultation and advice during construction to help the BLM ensure the construction meets the goals	0%	The project is not yet in construction.

of the project.		
2. Provide the BLM consultation and advice as needed during renovation of preserved facilities, to meet goals of the project.	0%	The project is not in construction.
<b>Phase 5 Deliverables:</b>		
1. Assess and identify furnishings and equipment based upon facility needs; provide the BLM information related to furnishings and equipment for new and preserved facilities so that the BLM can procure these items, within project funding under this Cooperative Assistance Agreement.	20%	We are in the process with Rex Bell Jr of completing an inventory or items he will donate or sell to be exhibited in the planned museum at the ranch. Most equipment and furnishing planning will occur during the construction period.

**Submitted by:**

**Margaret N. Rees, Principal Investigator**

October 12, 2010

**Date**

# **ATTACHMENTS**

## Walking Box ranch project- quarterly progress report (July 2010 – September 2010)

### Project Goal:

The final objective to assess the sustainable (renewable and/or energy efficient) energy potential of the Walking Box ranch led us to divide the project into tasks. The following is a brief report on the progress of each task in this quarter.

### **Task 1: Renewable Energy Resource Monitoring**

The weather station has continued to perform as expected and the meteorological data collection continued during this quarter. In addition, the satellite communications and hourly updated online display of the collected data has been good. As further improvements on the data management, an advanced user interface to provide additional options is being developed. This interface can be used to view the past and current meteorological information according to user preferences such as daily, monthly average radiations.

The raw data file received from the site, which is in (.DAT) format is imported to the database using ETL (extract, transform and load) tools of Microsoft SQL Server Integration Services (SSIS). A dataflow package is created in SSIS that transforms the data from a raw (.DAT) file to a database file. A job is assigned to SQL Server agent to update the database file with the newly collected data every one hour. A reporting server is currently being developed using SQL Server Reporting Services (SSRS) to accept user preferences of date and other input variables, and thus, generate a report to display the requested information in text, table or graphical formats.

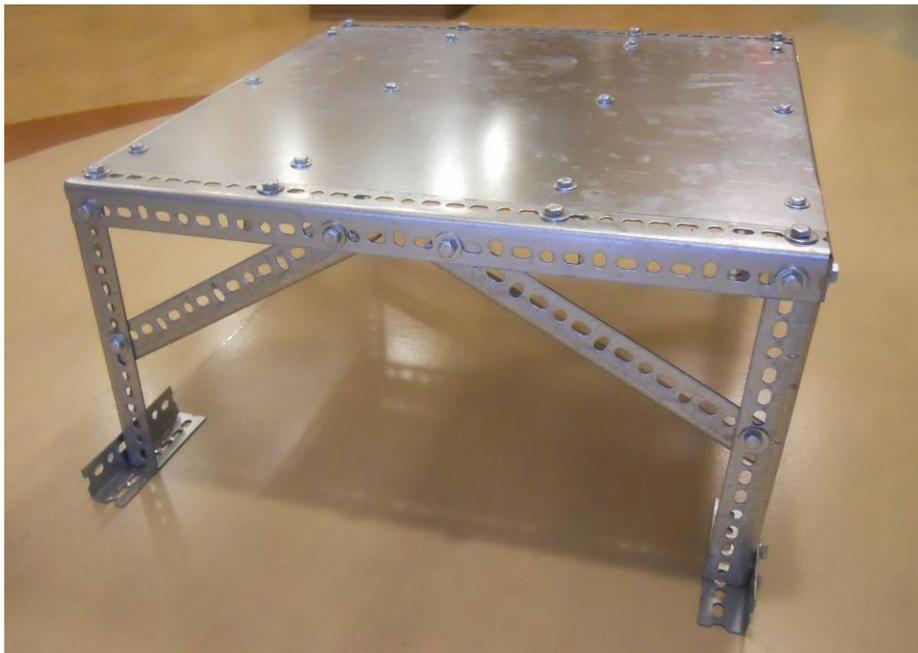


Figure 1. DNI tracker stand for installation on the roof-top

The proposed direct normal incidence (DNI) radiation measurement sensor (pyranometer with dual axis tracking) is ready to be installed alongside the weather station at Walking Box ranch. The DNI tracker requires a leveled plan for proper operation. Due to the pitch of the building roof where the weather station is installed, a stand is needed to mount the DNI tracker. The stand was fabricated (shown in Figure 1) and is ready to be installed. The tracker requires 110V power supply from the interior of the building to the roof top which demands conduit installations. *The team is waiting for the approvals to install the conduits.*

Progress index: Progress on this task is as expected and level of satisfaction is good.

### **Task 2: Energy Efficiency in Buildings**

Building envelope studies, from a passive energy savings stand point, were initiated. Several journal articles and other technical publications are being reviewed to identify the latest developments in the energy efficiency building components. The building envelope components reviewed so far includes roofs, fenestration (windows & doors) and walls (insulation). We have already identified various types of roofs and roof insulations (for hot and arid climatic conditions) which can reduce the heat transfer from and to the building which reduces heating and cooling loads experienced by air conditioning units. Currently, walls and fenestration are being assessed for applicability in desert type climatic conditions.

Progress index: Progress on this task is as expected and level of satisfaction is good.

### **Task 3: Solar Water Heater Studies**

Different types of solar water heating systems will be assessed for applicability at the Walking Box ranch. One flat plate collector type and two evacuated glass tube collector type solar water heating systems were installed on the roof of the Thomas T. Beam Engineering Complex (TBE) at UNLV campus (Las Vegas) as shown in Figure 2. A weather station comprising a temperature sensor, a hygrometer, an anemometer, a wind vane and a pyranometer mounted on a mast is installed along side the solar water heater collectors to measure the necessary weather parameters for the purpose of performance calculations (as shown in Figure 3). The data collected from the solar water heating systems will be used to evaluate their performance. A few tests designed to be run in near future are:

1. Variation in the rate of heat transfer with the variation in water flow rate.
2. Cost and heat exchange effectiveness comparisons of direct heat transfer evacuated glass tube type solar water heater and indirect heat transfer evacuated glass tube type solar water heater.

Few installation issues have been identified during trial runs and they are fixed and the testing will start in a few days.

Progress index: This task's progress is as expected and level of satisfaction is good.



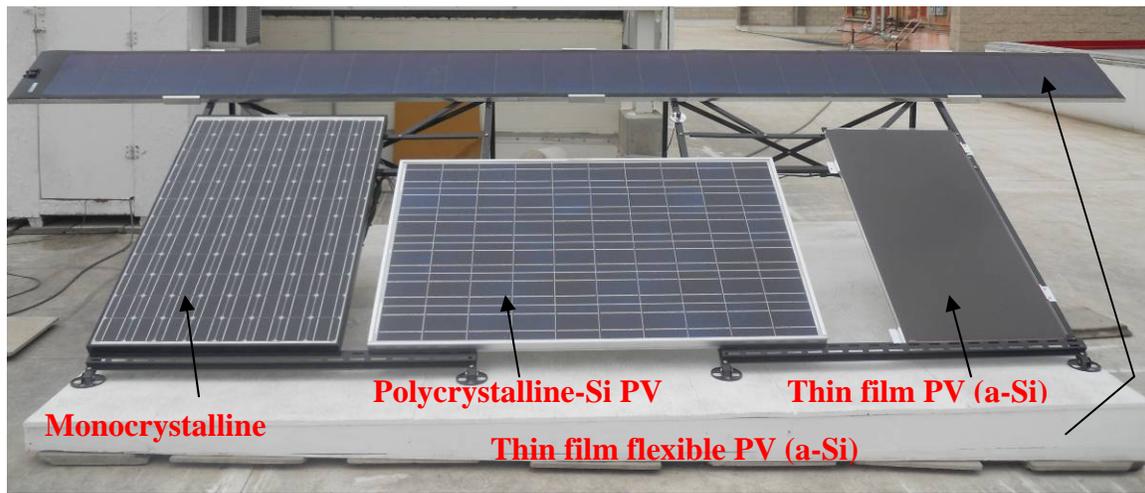
**Figure 2. Solar water heaters being tested**



**Figure 3. Weather Station alongside the other installations**

#### **Task 4: Solar PV System Studies**

Net zero (electric) energy buildings at the Walking Box Ranch can be achieved by applying solar PV systems. Thus the focus of this task is to identify the most suitable PV technology/technologies for applicability at the ranch buildings. Four different types of Photovoltaic (PV) systems which include one monocrystalline silicon, one polycrystalline silicon and two different thin-film PV (flexible and non-flexible) technologies were all assembled on the same plane on the roof top of UNLV TBE building, shown in Figure 4. The tests have already started. These tests will allow the team to measure the performance characteristics of different types of PV technologies for hot-arid desert type climatic conditions. An automated data collection system has been developed, which logs the data to a notebook computer at continuous intervals. Several performance characteristics such the I-V and temperature dependency can be obtained from the collected data. Figure 5 shows the computer controlled relays used to switch between panels for testing using one common IV tracker setup. Also, a life cycle cost analysis (LCCA) will be carried out to determine the best PV technology for applicability at the Walking Box ranch.



**Figure 4. Different types of PV systems installed at the same plane**



**Figure 5. Computer controlled relays to switch between the panels**

Progress index: This task's progress is as expected and level of satisfaction is good.

**Conclusion:**

The overall progress of the project seems satisfactory and the pace of the project is fairly decent. The project is expected to accomplish the forecast goals in time.