Victor Valley College
Electrical and Fire Alarm Survey

Victor Valley College
18422 Bear Valley Road
Victorville, CA 92395

November 30, 2010

Submitted by
P2S Engineering, Inc.
Background and Scope

Victor Valley College is located in the High desert region of southern California 36 miles north of San Bernardino. The area covered by the district is approximately 1,800 square miles, serving about 380,000 citizens.

Victor Valley College district was established in 1961 to serve the cities and communities of Adelanto, Apple Valley, Helendale, Hesperia, Lucerne Valley, Ore Grande, Phelan, Pinon Hills, Victorville and Wrightwood.

Each semester more than 13,000 students pursue associate’s degrees, transfer to a four-year college or university or receive career certificates that qualify them to enter their chosen field.

Victor Valley College is currently served from a 12kV Southern California Edison (SCE) service originating from the north east side of the campus. The 12kV SCE conductors serve one 12kV/4160V transformer which in turn provides power to a 5kV, 1,200A switchgear located in the Central Plant that currently meet the electrical demand for 20 facilities on the campus (some facilities consist of multiple buildings). The switchgear is comprised of a metering section and 5kV, 600A loadbreak switches. Circuits originating from these switches provide multiple 5kV radial systems and serve the aforementioned 20 facilities. Additionally, four remaining facilities not located in proximity to the campus-owned 5kV distribution system are served directly from SCE.

To meet the changing needs of the campus, P2S was contracted to evaluate the existing campus electrical distribution and fire alarm infrastructure systems and determine what upgrades are necessary to accommodate the planned expansion.

Objective

The objective of this report is to evaluate the existing electrical and fire alarm infrastructure systems currently serving the existing Victor Valley College Campus. We will consider alternatives for improvements, make cost-effective and specific recommendations as necessary, to alter/upgrade/modify the existing to support new buildings, major renovations and building retrofits that form part of the campus Facilities Master Plan.

Report Overview

Our following report provides an analysis of the present electrical and fire alarm infrastructure systems currently serving the campus. It identifies potential problems associated with the system, defines future requirements and outlines recommended solutions.
The following are included in this survey submittal:

- Executive Summary
- System description and photos of the existing building electrical distribution and fire alarm equipment.
- Updated 5kV single line diagram and site plan in AutoCAD format.

Summary of our Findings and Recommendations

Electrical Distribution Findings:
- While the electrical system is adequately sized to support the existing facilities at the campus, certain sections of the medium voltage feeders should be upgraded.
- An arc-flash hazard analysis should be performed from the 5kV main switchgear to the low voltage panelboards in association with ANSI/IEEE and used to determine the arc fault currents and arc flash hazards.
- Cable tags should be provided for the feeders in each pullbox that contain the circuit designation, origin, destination and size and be tied on with lock-on type nylon ties.
- In order to provide the campus with redundancy and capability of scheduling maintenance on high voltage equipment without interrupting power to the campus, the distribution system should be modified with a primary-selective configuration.

Fire Alarm System Findings:
- The majority of the campus fire alarm system at the campus needs to be upgraded with a “state of the art” fully addressable system with a central annunciation system located at the Campus Police Station or other 24-hour attended location.
Electrical System Description

The Victor Valley College campus is currently served from a 4160V, 1,200A 3-phase, 4-wire switchgear that derives its service from a 5kV Southern California Edison (SCE) feeder. The SCE transformer is located adjacent to the Central Plant and from there the power line comes in from an underground 12kV transmission line. The switchgear comprises of (5) 5 kV 600 amp switches with 250 amp current limiting fuses with no spares or space for future growth. The main 5kV switchgear is provided with an SCE meter section and a 1,200 amp main load break switch with a 750A current-limiting fuse. This main switchgear is located in the Central Plant Building on the north side of the campus. The service is metered at 5kV and distributes power through four underground radial feeders that run around the perimeter of the campus through underground pullboxes to campus owned transformers which then feed the individual buildings.

Power to each building on campus is served through four underground feeders originating from the main switchgear. The four (4) medium voltage feeders are routed in a combination of 3” and 4” rigid conduit and load interrupter switches at the individual buildings. These load interrupter switches feed the transformer located at or in each building. Feeders 1 and 2 circle along the west half of the upper campus where circuit 1 ends at pullbox #10 feeding the Music Building. Circuit #2 continues to electrical pullbox #14 and feeds the Student Services and Performing Arts Buildings. Feeder 3 circles along the east half of the upper campus and ends at pullbox #14A and feeds the Student Activities Center. Feeder 4 feeds all buildings on the lower campus not served directly by SCE. In total, 20 facilities (some facilities consist of multiple buildings) are served from the campus-owned distribution system and an additional 4 are served directly from SCE.

All of the existing electrical systems that are owned by the campus have load interrupter switches which provide isolation of individual buildings and enable the facilities personnel to isolate a particular building for maintenance or expansion. However the radial feeders have multiple buildings on each circuit and if there is a fault, maintenance issue, or expansion to the circuit, multiple buildings will be shut down with no alternate power source. Therefore the current system offers limited isolation to the individual buildings. Three buildings (Science, Library, Student Activities Center) are an exception to this, however, as they are fed with a primary selective configuration and can switched to an alternate circuit as needed.

Currently there are four buildings on circuit #1, five facilities on circuit #2, three facilities on circuit #3, seven facilities on circuit #4 and one facility (the Central Plant) on circuit #5. Feeders 1 thru 4 are comprised of a range of conductor sizes: all begin from the Central Plant as 3# 250kcmil medium
voltage cables but are sized down to as small as #2awg in some cases. Circuits 1 and 2 contain the #2awg conductors while the smallest on circuits #3 and #4 are 250kcmil and 2/0, respectively. This means circuits #1,#2,#3,and #4 currently have respective capacities of 125A, 125A, 260A, and 185A. The total capacity (in kilowatts) of each feeder is 900kW, 900kW, 1,875kW, and 1,330kW, respectively.

A review of the existing capacities revealed that the system is adequately sized to meet the demands of the current campus. The following is a brief description of each of the feeders and their routing to serve each building on campus.

Feeder “1” currently serves the Music, Art, Liberal Arts, and Health and Public Safety buildings.

Feeder “2” serves the Advanced Technology, Science, Student Services (1 & 2), Performing Arts Center, and Counseling and Administration buildings.

Feeder “3” serves the Library Resource Center, Academic Commons, and Student Activities Center.

Feeder “4” serves the Welding, Auto Shop, Construction Technology, Lower Portables, Adapted PE Center, Gymnasium and Weight Room buildings.

Feeder “5” serves the Central Plant.

The Administration Services, Child Development Center, Lower Campus Portables and Maintenance Office are individually served directly from SCE.

See existing site electrical distribution system and existing campus single-line diagram included with this report for more details.

**Campus Distribution System Capacity Evaluation**

The highest peak demand recorded (over the last 18 months) in September, 2009, for the main switchgear meter by the campus was 1,800kW or 1,911 kVA with a power factor of .94 which equates to 265 amps on the 1,200 amp main switchgear. A review of the existing capacities of the feeders revealed that the existing electrical system is sized to support the existing facilities at the campus. The total consumption for the whole campus over the last 20 months was approximately 12.3 million kilowatt-hours.

The installed capacities of existing buildings on the campus 5kV distribution system are listed in Table 1. Approximate demands of the buildings are calculated at 25% of the installed capacities in absence of available metered data. The energy consumption, maximum peak demand, and costs by each of the last 20 months are also included below.
Table 1: Campus Installed Capacities

<table>
<thead>
<tr>
<th>Bldg #</th>
<th>Building Name</th>
<th>Installed Capacity (kVA)</th>
<th>Demand (kVA) @ 25% of Installed Capacity</th>
<th>Feeder #</th>
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<tbody>
<tr>
<td>20</td>
<td>Music</td>
<td>375</td>
<td>90</td>
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<tr>
<td>21</td>
<td>Advanced Technology Arts</td>
<td>750</td>
<td>190</td>
<td>2</td>
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<tr>
<td>22</td>
<td>Arts</td>
<td>375</td>
<td>90</td>
<td>1</td>
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<tr>
<td>30</td>
<td>Liberal Arts</td>
<td>375</td>
<td>90</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>Science Building</td>
<td>500</td>
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<tr>
<td>32</td>
<td>Health and Public Safety</td>
<td>225</td>
<td>60</td>
<td>1</td>
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<tr>
<td>40</td>
<td>Central Plant</td>
<td>1000</td>
<td>250</td>
<td>5</td>
</tr>
<tr>
<td>41</td>
<td>Library</td>
<td>750</td>
<td>190</td>
<td>3</td>
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<td>42</td>
<td>Academic Commons</td>
<td>260</td>
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<td>3</td>
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<td>44</td>
<td>Student Activities Center</td>
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<tr>
<td>52</td>
<td>Student Services</td>
<td>450</td>
<td>110</td>
<td>2</td>
</tr>
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<td>54</td>
<td>Performing Arts Center</td>
<td>1050</td>
<td>260</td>
<td>2</td>
</tr>
<tr>
<td>55</td>
<td>Counseling &amp; Administration</td>
<td>300</td>
<td>80</td>
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<tr>
<td>61</td>
<td>Welding</td>
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<td>64</td>
<td>Automotive</td>
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<td>4</td>
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<td>65</td>
<td>Construction Technology</td>
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<td>4</td>
</tr>
<tr>
<td>66</td>
<td>Lower Portables</td>
<td>300</td>
<td>80</td>
<td>4</td>
</tr>
<tr>
<td>70</td>
<td>Adapted PE Center</td>
<td>300</td>
<td>80</td>
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<tr>
<td>71</td>
<td>Gym</td>
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</tr>
<tr>
<td>72</td>
<td>Weight Room</td>
<td>45</td>
<td>10</td>
<td>4</td>
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</tbody>
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Total kVA: 10255  Total Amps: 1420

Bldg # | Building Name    | Installed Capacity (kVA) | Demand (kVA) @ 25% of Installed Capacity | Feeder # |
<table>
<thead>
<tr>
<th></th>
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<tbody>
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</tr>
<tr>
<td>32</td>
<td>Health and Public Safety</td>
<td>225</td>
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Total kVA: 1350  Total Amps: 190
### Table 1 (continued): Campus Installed Capacities

<table>
<thead>
<tr>
<th>Bldg #</th>
<th>Building Name</th>
<th>Installed Capacity (kVA)</th>
<th>Demand (kVA) @ 25% of Installed Capacity</th>
<th>Feeder #</th>
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</thead>
<tbody>
<tr>
<td>21</td>
<td>Advanced Technology</td>
<td>750</td>
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<td>2</td>
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<tr>
<td>31</td>
<td>Science Building</td>
<td>500</td>
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<td><strong>Total kVA</strong></td>
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<td><strong>Total Amps</strong></td>
<td><strong>420</strong></td>
<td><strong>110</strong></td>
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</tr>
<tr>
<td>41</td>
<td>Library</td>
<td>750</td>
<td>190</td>
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</tr>
<tr>
<td>42</td>
<td>Academic Commons</td>
<td>260</td>
<td>70</td>
<td>3</td>
</tr>
<tr>
<td>44</td>
<td>Student Activities Center</td>
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<td></td>
<td><strong>Total kVA</strong></td>
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<td><strong>390</strong></td>
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<td><strong>Total Amps</strong></td>
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<td><strong>50</strong></td>
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<td>Welding</td>
<td>750</td>
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<tr>
<td>64</td>
<td>Automotive</td>
<td>450</td>
<td>110</td>
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<td>65</td>
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<td>500</td>
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<td>66</td>
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<td>300</td>
<td>80</td>
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<td>Adapted PE Center</td>
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<td>Weight Room</td>
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<td></td>
<td><strong>Total kVA</strong></td>
<td><strong>3345</strong></td>
<td><strong>850</strong></td>
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<td><strong>Total Amps</strong></td>
<td><strong>460</strong></td>
<td><strong>120</strong></td>
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Recent Electrical Cost

Recent Maximum Electrical Demand
Findings and Recommendations

Distribution Feeder Sizes and Identification

While the electrical system is adequately sized to support the existing facilities at the campus, it is recommended that certain sections of the medium voltage feeders be upgraded. Particularly, the portion of Feeder #1 from pullbox #6 to pullbox #10, as well as the portion of Feeder #2 from pullbox #9 to pullbox #11A. See the single line diagram and electrical site plan for the locations of these feeders.

The above mentioned feeder sections are currently sized at #2awg. While this is acceptable for a tap that serves a single small facility, feeders that serve multiple buildings should be larger to provide spare capacity for additional buildings to be cut in later. Therefore, it is recommended that these feeder sections be upgraded with 5kV, 2/0, 133%, EPR, MV-90 cables at a minimum.

Currently there is minimal identification of the medium voltage feeders in the pullboxes. In order to provide facilities and maintenance personnel additional knowledge when working on or modifying the distribution system, it is recommended that laminated melamine cable tags be provided for the feeders in each pullbox that contain the circuit designation, origin, destination and size and be tied on with lock-on type nylon ties.

Arc Flash Study

Currently, no arc flash labeling exists on the campus electrical distribution equipment. It is recommended that an arc-flash hazard analysis be performed from the 5kV main switchgear to the low voltage panelboards in association with ANSI/IEEE and used to determine the arc fault currents and arc flash hazards.

Results of the arc-flash analysis are used to identify the flash-protection boundary and incident energy to which employees could be exposed during their work on or near electrical equipment. The calculations are performed at each level of the distribution system at assigned working distances.

Safety is the most important objective when designing electrical systems. Energized parts should be sufficiently enclosed or isolated to avoid exposing personnel to explosion, fire, arcing, or shock. Safety should always take priority over service continuity, equipment damage and economics.
Primary Selective Distribution System

A critical aspect in evaluating the reliability of a system is to study the failure rates from the utility and failure rates internal to the campus in the past. Discussions with the campus maintenance staff revealed that there have been minimum failures in the campus owned 5kV distribution system.

The campus however needs to have more redundancy in their system to help isolate each building on campus and also be able to conduct maintenance on a feeder without affecting power service to each building on campus.

In order to provide the campus with redundancy and capability of scheduling maintenance on high voltage equipment without interrupting power to the campus, a primary-selective configuration is recommended.

This system would provide the campus with the capability of isolating faults within the campus distribution system and minimize power interruptions to the buildings during maintenance on the medium voltage distribution system.

A primary selective system with isolating switches at each building offers improved system reliability and service continuity in comparison to a radial distribution system. In this system, power is supplied from two circuits to selector switches that isolate each transformer in the system, with one switch closed and the other open. As mentioned previously, three buildings on campus (Science, Library, Student Activities Center) are currently designed with this configuration.

With a primary-selective system in place, a section of the cable may be isolated from the loop for repair or maintenance while other parts of the system are still functioning. While most of the underground infrastructure is currently equipped to handle a primary-selective system, additional conduits would have to be installed between a majority of the pullboxes (approximately nine) containing Feeder #4.
Fire Alarm System Description

An evaluation of the existing fire alarm system at the campus revealed that the campus has a mix of different fire alarm control panels. The system at each building is monitored via the utility telephone system.

Findings and Recommendations

Most buildings on the Victor Valley College campus are equipped with a stand-alone fire alarm system. There are a few different fire alarm systems including Notifier, Simplex, and FireLite. The FireLite and many of the Simplex panels are obsolete. Furthermore, several buildings on campus do not have code-compliant fire alarm systems. The more recent buildings on campus are compliant, however, and have been designed with either a Simplex 4100U or Notifier NFS320 fire alarm control panel and corresponding system.

The majority of the campus fire alarm system at the campus needs to be upgraded with a “state of the art” fully addressable system with a central annunciation system located at the Campus Police Station or other 24-hour attended location. The new fire alarm system should utilize a new telecommunication fiber optic network installed at the campus to report to the central annunciation system.

Today’s microprocessor-based fire alarm systems offer excellent versatility and a multitude of options. Examples of the new technologies available include.

1. Addressable Technology – The exact location and status (alarm or trouble) of any field device (initiating or indicating) will be monitored at the fire alarm panel and displayed by means of a digital alphanumeric display.

2. Analog Technology – Detailed device information (such as sensitivity), in addition to alarm and trouble status will be monitored and tracked by the fire alarm panel. This is a particularly useful tool for identifying detectors that have become dirty over time and may need to be cleaned. This is effective in reducing false alarms of the life of the system.

3. True Peer to Peer Communication Technology – All remote fire alarm panels are the stand-alone type and will be in constant communication with other panels on the network. The alarm or trouble status of any panel can be identified at all panels on the network. Since each panel is a stand-alone panel, it can maintain full functionality even if the main fire alarm (or any other panel on the network) becomes inoperable or separated from the network.
4. IP Networking of Fire Alarm panels allows fire alarm panels from different manufacturers to be utilized. IP networking utilizes the infrastructure for transmission of alarms and for supervision of the system not a dedicated fire alarm cable.

Due to the size of the project, the system should be installed in phases. First the new fiber optic infrastructure should be in place, once the new fiber infrastructure is in place, it will be utilized to connect the fire alarm panels together and report to the centralized annunciator system.

New control panels and network annunciator panels should be installed adjacent to the existing panels in each building and a phased cut over will take place as new buildings come on line or existing buildings are remodeled. The hard wired and obsolete devices should be replaced with new addressable devices connected to the new panels and network. More detail for what is currently at and needed for each building is described in the building write-ups in this report.
Electrical System Description

The Administration Services Building is currently served from a 480/277V padmounted transformer owned and maintained by SCE. The service to the building is provided from the west side of the building at an SCE manhole and terminates in the padmounted transformer.

The transformer serves a corresponding 400A, 480V, 3-phase 3-wire main distribution board which meets the lighting and power demands of the building. The Administration Annex also appears to be served from this building, although this was not conclusively determined.

Recommendations

Visual inspection of the Administration Services Building main electrical equipment revealed that the main distribution boards are old, have reached the ends of their useful lives and should be replaced in the near future.

Visual inspection of the Administration Annex Building main electrical equipment revealed that it is in good condition.
Fire Alarm System Description

The Administration Services Building is currently equipped with an addressable fire alarm system manufactured by Simplex-Grinnell. The fire alarm system comprises of manual pull stations, horns.

The Administration Annex Building does not appear to have a functioning fire alarm system.

Recommendations

The existing fire alarm system in the Administration Services Building should be upgraded to add strobes in public areas to comply with current code requirements.

A complete addressable fire alarm system comprised of a control panel, initiating and notification devices should be installed in the Administration Annex Building to comply with current code requirements.
Electrical System Description

The Child Development Center Building is currently served from a 208/120V padmounted transformer owned and maintained by SCE. The service to the building is provided from the west side of the building at an SCE manhole and terminates in the padmounted transformer.

The transformer serves a corresponding 1200A, 208/120V, 3-phase 4-wire main distribution board which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the Child Development Center Building main electrical equipment revealed that the main distribution board is in good condition and should be retained.
Fire Alarm System Description

The Child Development Center Building is currently equipped with an addressable fire alarm system manufactured by Simplex-Grinnell. The fire alarm system comprises of manual pull stations, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
**Electrical System Description**

The Music Building is currently served from a pair of outdoor 5kV, 200A load interrupter switches and dry type transformers. The 5kV service to the building is provided from the west side of the building at pullbox #10 and terminates in the 5kV load interrupter switches.

One transformer is rated at 300kVA, 480/277V, 3-phase, 4-wire, and serves a corresponding 600A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and motor loads of the building. The second transformer is rated at 75kVA, 208/120V, 3-phase, 4-wire and serves a corresponding 250A, 208/120V, 3-phase, 4-wire main distribution board which meets the power demands of the building.

**Recommendations**

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Music Building is currently equipped with an addressable fire alarm system manufactured by Simplex-Grinnell. The fire alarm system comprises of manual pull stations and horns.

Recommendations

The existing fire alarm system should be upgraded to add strobes in public areas to comply with current code requirements.
Electrical System Description

The Advanced Technology Building is currently served from an indoor 1000kVA substation comprised of a 5kV load interrupter switch, dry-type, 1000kVA, 4.16kV-480/277V transformer and a 1600A main distribution board located in the main electrical room in the basement of the building. The 5kV service to the building is provided from the east side of the building at pullbox #11A and terminates in the 5kV load interrupter switch.

The 1000kVA, 480/277V, 3-phase, 4-wire, dry-type transformer and serves a corresponding 1200A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and motor loads of the building. A second transformer is rated at 750kVA, 208/120V, 3-phase, 4-wire and serves a corresponding 2000A, 208/120V, 3-phase, 4-wire main distribution board which meets the power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Advanced Technology Building is currently equipped with an addressable fire alarm system manufactured by Notifier. The fire alarm system comprises of manual pull stations, smoke detectors, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
Electrical System Description

The Arts Building is currently served from a pair of 5kV, 200A load interrupter switches and dry type transformers located in an enclosure on the north side of the building. The 5kV service to the building is also provided from the north side of the building at pullbox #6 and terminates in the 5kV load interrupter switches.

One transformer is rated at 300kVA, 480/277V, 3-phase, 4-wire, and serves a corresponding 300A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and motor loads of the building. The second transformer is rated at 75kVA, 208/120V, 3-phase, 4-wire and serves a corresponding 225A, 208/120V, 3-phase, 4-wire main distribution board which meets the power demands of the building.

Note in the picture above that proper working clearance of five feet has not been provided between the 5kV switch and 300kVA transformer.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Arts Building is currently equipped with a zoned fire alarm system manufactured by Silent Knight. The fire alarm system comprises of manual pull stations and horns.

Recommendations

The existing fire alarm system should be upgraded to add strobes in public areas to comply with current code requirements.
Electrical System Description

The Liberal Arts Building is currently served from a pair of 5kV, 200A load interrupter switches and dry type transformers located in the northeast side of the building. The 5kV service to the building is also provided from the northeast side of the building at pullbox #6 and terminates in the 5kV load interrupter switches.

One transformer is rated at 150kVA, 480V, 3-phase, 3-wire, and serves a corresponding 600A, 480V motor control center which meets the motor loads of the building. The second transformer is rated at 225kVA, 208/120V, 3-phase, 4-wire and serves a corresponding 600A, 208/120V, 3-phase, 4-wire main distribution board which meets the power and lighting demands of the building.

Note in the picture above that proper working and exit clearances of five feet has not been provided for the 5kV switches and 150kVA transformer.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Liberal Arts Building is currently equipped with a zoned fire alarm system manufactured by Simplex Grinnell. The fire alarm system comprises of manual pull stations and horns.

Recommendations

The existing fire alarm system should be upgraded to add strobes in public areas to comply with current code requirements.
Electrical System Description

The Science Building is currently served from an indoor 500kVA substation comprised of two 5kV load interrupter switches, dry-type, 500kVA, 4.16kV-480/277V transformer and an 800A main distribution board located in the main electrical room of the building. The 5kV service to the building is provided from the east side of the building at pullbox #7 and terminates in the 5kV load interrupter switches.

The Science Building is fed from the 5kV campus distribution in a primary-selective configuration, with feeders 1 and 2 providing the service.

The 500kVA, 480/277V, 3-phase, 4-wire, dry-type transformer and serves a corresponding 800A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Science Building is currently equipped with an addressable fire alarm system manufactured by Simplex Grinnell. The fire alarm system comprises of manual pull stations, smoke detectors, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
Electrical System Description

The Health and Public Safety Building is currently served from an outdoor 5kV, 200A load interrupter switch and dry type transformer located on the east side of the building. The 5kV service to the building is also provided from the east side of the building at pullbox #6 and terminates in the 5kV load interrupter switch.

The dry-type transformer is rated at 225kVA, 208/120V, 3-phase, 4-wire, and serves a corresponding 600A, 208/120V, 3-phase 4-wire main distribution board located in the main electrical room which meets the lighting and power demands of the building. The portables adjacent to the Health and Public Safety Building also appear to be served from this building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformer and main distribution board are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Health and Public Safety Building is currently equipped with a zoned fire alarm system manufactured by Standard Electric. The fire alarm system comprises of manual pull stations and horns.

Recommendations

The existing fire alarm system in the Health and Public Safety Building should be replaced with a new addressable fire alarm system complete with a control panel, initiating and notification devices to comply with current code requirements.
Electrical System Description

The Library Building is currently served from an indoor 750kVA substation comprised of two 5kV load interrupter switches, dry-type, 750kVA, 480/277V transformer and a 1200A main distribution board located in the main electrical room of the building. The 5kV service to the building is provided from the south side of the building at pullbox #4 and terminates in the 5kV load interrupter switches.

The Science Building is fed from the 5kV campus distribution in a primary-selective configuration, with feeders 3 and 4 providing the service.

The 750kVA, 480/277V, 3-phase, 4-wire, dry-type transformer serves a corresponding 1200A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Science Building is currently equipped with an addressable fire alarm system manufactured by Simplex Grinnell. The fire alarm system comprises of manual pull stations, smoke detectors, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
Electrical and Fire Alarm Survey

Electrical System Description

The Academic Commons Building is currently served from a pair of 5kV, 200A load interrupter switches and dry type transformers located in the main electrical room of the building. The 5kV service to the building is provided from the west side of the building at pullbox #4 and terminates in the 5kV interrupter switch.

One transformer is rated at 112.5kVA, 480V, 3-phase 3-wire and serves a corresponding 400A, 480V, 3-phase 3-wire main distribution board which meets the lighting and motor loads of the building. The second transformer is rated at 150kVA, 208/120V, 3-phase 4-wire and serves a corresponding 600A, 208/120V, 3-phase 4-wire main distribution board which meets the power demands of the building.

Note in the picture above that proper working clearance of five feet has not been provided between the 5kV switch and 112.5kVA transformer.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Academic Commons Building is currently equipped with an addressable fire alarm system manufactured by Simplex-Grinnell. The fire alarm system comprises of manual pull stations, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
Electrical System Description

The Student Activities Center Building is currently served from an indoor 500kVA substation comprised of two 5kV load interrupter switches, dry-type, 500kVA, 4.16kV-480/277V transformer and an 800A main distribution board located in the main electrical room of the building. The 5kV service to the building is provided from the north side of the building at pullbox #3 and terminates in the 5kV load interrupter switches.

The Student Activities Center Building is fed from the 5kV campus distribution in a primary-selective configuration, with feeders 3 and 4 providing the service.

The 500kVA, 480/277V, 3-phase, 4-wire, dry-type transformer serves a corresponding 800A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Student Activities Center Building is currently equipped with an addressable fire alarm system manufactured by Simplex Grinnell. The fire alarm system comprises of manual pull stations, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
Electrical System Description

The Student Services Buildings are currently served from a pair of 5kV, 200A load interrupter switches and dry type transformers located in an enclosure on the west side of the buildings. The 5kV service to the building is also provided from the west side of the building at pullbox #12 and terminates in the 5kV load interrupter switches.

One transformer is rated at 150kVA, 480V, 3-phase, 3-wire, and the second transformer is rated at 300kVA, 208/120V, 3-phase, 4-wire and serves a corresponding 208/120V, 3-phase, 4-wire main distribution boards which meet the lighting and power demands of both buildings.

Note in the picture above that proper working and exit clearances have not been provided for the medium voltage equipment.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Student Services Buildings are currently equipped with a fire alarm system manufactured by Simplex Grinnell. The fire alarm system comprises of manual pull stations, horns, and strobes in the restrooms.

Recommendations

The existing fire alarm system should be upgraded to add strobes in the remaining public areas to comply with current code requirements.
Electrical System Description

The Performing Arts Center Building is currently served from multiple indoor 5kV load interrupter switches, dry-type transformers and main distribution boards. The 5kV service to the building is provided from the east side of the building at pullbox #12 and terminates in the 5kV load interrupter switches.

A 750kVA, 208/120V transformer that serves a 2000A, 208/120V, 3-phase, 4-wire main distribution board and two additional 150kVA transformers combine to meet the lighting and power demands of the building.

Note in the picture above that proper working clearances have not been provided for the 5kV load interrupter switches.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switches is also in good condition and should be retained.
Fire Alarm System Description

The Performing Arts Center Building is currently equipped with an addressable fire alarm system manufactured by Notifier. The fire alarm system comprises of manual pull stations, smoke detectors, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
Electrical System Description

The Counseling & Administration Building is currently served from an indoor 5kV, 200A load interrupter switch and dry type transformer located in the main electrical room of the building. The 5kV service to the building is provided from the south side of the building at pullbox #11A and terminates in the 5kV load interrupter switch.

The dry-type transformer is rated at 300kVA, 480/277V, 3-phase, 4-wire, and serves a corresponding 400A, 480/277V, 3-phase 4-wire main distribution board located in the same room which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformer and main distribution board are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Counseling and Administration Building is currently equipped with a zoned fire alarm system manufactured by Faraday. The fire alarm system comprises of manual pull stations, horns, bells, and strobes in the restrooms.

Recommendations

The existing fire alarm system should be replaced with a new addressable fire alarm system complete with a control panel, initiating and notification devices to comply with current code requirements.
Electrical System Description

The Welding Building is currently served from an outdoor 5kV, 200A load interrupter switch and dry type transformer located on the north side of the building. The 5kV service to the building is provided from the west side of the building at pullbox #6L and terminates in the 5kV load interrupter switch.

The dry-type transformer is rated at 750kVA, 480/277V, 3-phase, 4-wire, and serves a corresponding 600A, 480/277V, 3-phase 4-wire motor control center located in the welding shop area which meets the lighting and power demands of it as well as the Electronics and Technical Education Buildings.

The dry-type transformer is also the tie-in for the 1.25MW tracking photovoltaic system located at the north end of the campus.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformer and main distribution board are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Welding Building does not appear to have a functioning fire alarm system.

Recommendations

A complete addressable fire alarm system comprised of a control panel, initiating and notification devices should be installed in the Welding Building to comply with current code requirements.
Electrical System Description

The Automotive Building is currently served from three indoor 5kV, 200A load interrupter switches and dry type transformers located in the main electrical room of the building. The 5kV service to the building is provided from the west side of the building at pullbox #5L and terminates in the 5kV load interrupter switches.

The dry-type transformers are rated at 300kVA, 480/277V, 3-phase, 4-wire, 150kVA, 480/277V, 3-phase, 4-wire, and 75kVA, 480/277V, 3-phase, 4-wire. The 300kVA transformer serves a corresponding 400A, 480/277V, 3-phase 4-wire main distribution board located which meets the lighting and power demands of it as well as the Lab and Digital Animation Buildings.

Note in the picture above that proper working and exit clearances have not been provided for the 5kV switch and dry type transformer.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution board are in good condition and should be retained. The 5kV load interrupter switches are also in good condition and should be retained.
Fire Alarm System Description

The Automotive Building is currently equipped with a fire alarm system manufactured by Simplex. The fire alarm system comprises of manual pull stations, horns, and strobes in the restrooms.

Recommendations

The existing fire alarm system should be upgraded to add strobes in the remaining public areas to comply with current code requirements.
Electrical System Description

The Construction Technology Building is currently served from an outdoor 5kV, 200A load interrupter switch and dry type transformer located adjacent to the tennis courts. The 5kV service to the building is provided from the west side of the building at pullbox #3L and terminates in the 5kV load interrupter switch.

The dry-type transformer is rated at 500kVA, 480/277V, 3-phase, 4-wire, and serves a corresponding 800A, 480/277V, 3-phase 4-wire main distribution board located which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformer and main distribution board are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Construction Technology Building is currently equipped with a fire alarm system manufactured by Simplex. The fire alarm system comprises of manual pull stations, horns, and strobes.

Recommendations

The existing fire alarm system should be upgraded to add strobes in any remaining public areas to comply with current code requirements.
Electrical System Description

The Lower Portables are currently served from an outdoor 5kV, 200A load interrupter switch and dry type transformer located to the south of the building. The 5kV service to the building is provided from the west side of the building at pullbox #3L and terminates in the 5kV load interrupter switch.

The dry-type transformer is rated at 300kVA, 480/277V, 3-phase, 4-wire, and serves a corresponding 400A, 480/277V, 3-phase 4-wire main distribution board located which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformer and main distribution board are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Lower Portables do not appear to have a functioning fire alarm system.

Recommendations

A complete addressable fire alarm system comprised of a control panel, initiating and notification devices should be installed in the Lower Portables to comply with current code requirements.
Electrical System Description

The Adapted PE Center Building is currently served from an indoor 300kVA substation comprised of a 5kV load interrupter switch, dry-type, 300kVA, 4.16kV-480/277V transformer and a 450A main distribution board located in the main electrical room of the building. The 5kV service to the building is provided from the west side of the building at pullbox #2 and terminates in the 5kV load interrupter switch.

The 300kVA, 480/277V, 3-phase, 4-wire, dry-type transformer and serves a corresponding 450A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and power demands of the building

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Adapted PE Center Building is currently equipped with an addressable fire alarm system manufactured by Notifier. The fire alarm system comprises of manual pull stations, smoke detectors, horns and strobes and complies with current codes.

Recommendations

The existing fire alarm system is in good condition and should be retained.
Electrical System Description

The Gym Building is currently served from an outdoor 1000kVA substation comprised of a 5kV load interrupter switch, dry-type, 1000kVA, 4.16kV-480/277V transformer and a 1200A main distribution board located outside of the building. The 5kV service to the building is provided from the west side of the building at pullbox #2 and terminates in the 5kV load interrupter switch.

The 1000kVA, 480/277V, 3-phase, 4-wire, dry-type transformer and serves a corresponding 1200A, 480/277V, 3-phase 4-wire main distribution board which meets the lighting and power demands of the Gym building and Faculty Offices.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformers and main distribution boards are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Gym Building is currently equipped with a zoned fire alarm system manufactured by FireLite. The fire alarm system comprises of manual pull stations, horns and strobes.

Recommendations

The existing fire alarm system in the Gym Building should be replaced with a new addressable fire alarm system complete with a control panel, initiating and notification devices to comply with current code requirements.
Electrical System Description

The Weight Room Building is currently served from an outdoor 5kV, 200A load interrupter switch and dry type transformer located on the west side of the building. The 5kV service to the building is also provided from the west side of the building at pullbox #2 and terminates in the 5kV load interrupter switch.

The dry-type transformer is rated at 45kVA, 208/120V, 3-phase, 4-wire, and serves a corresponding 150A, 208/120V, 3-phase 4-wire main distribution board located in the building interior which meets the lighting and power demands of the building.

Recommendations

Visual inspection of the main electrical equipment revealed that the dry type transformer and main distribution board are in good condition and should be retained. The 5kV load interrupter switch is also in good condition and should be retained.
Fire Alarm System Description

The Weight Room Building is currently equipped with a zoned fire alarm system. The fire alarm system comprises of manual pull stations and horns.

Recommendations

The existing fire alarm system in the Weight Room Building should be replaced with a new addressable fire alarm system complete with a control panel, initiating and notification devices to comply with current code requirements.
**Electrical System Description**

The Portables are currently served from a 208/120V padmounted transformer owned and maintained by SCE. The service to the building is provided from the north side of the building at an SCE manhole and terminates in the padmounted transformer.

The transformer serves a corresponding 2000A, 208/120V, 3-phase 4-wire main distribution board which meets the lighting and power demands of the building.

**Recommendations**

Visual inspection of the Portables’ main electrical equipment revealed that the main distribution board is in good condition and should be retained.
Fire Alarm System Description

The Portables do not appear to have a functioning fire alarm system.

Recommendations

A complete addressable fire alarm system comprised of a control panel, initiating and notification devices should be installed in the Portables to comply with current code requirements.
Electrical System Description

The Maintenance Complex (which consists of the Print Shop, Warehouse, Maintenance and Operations Shops, and Fire Technology Buildings) are currently served from a 480/277V, 600A main distribution board fed from SCE.

Recommendations

Visual inspection of the Maintenance Complex main electrical equipment revealed that the main distribution board is in good condition and should be retained.
Fire Alarm System Description

The Maintenance Complex buildings do not appear to have a functioning fire alarm system.

Recommendations

A complete addressable fire alarm system comprised of a control panel, initiating and notification devices should be installed in the Maintenance Complex to comply with current code requirements.