1. ELECTRICAL SAFETY

1.1 PURPOSE

Energized electrical systems and equipment represent a significant hazard on every work site. The Contractor can reduce the risks associated with the performance of electrical work by developing, implementing, and enforcing an effective safety program that requires electrical work to be performed in accordance with the regulations of the National Electrical Code (NEC), OSHA and ANSI standards, and all other rules and regulations.

1.2 GENERAL

OSHA's electrical standards address the government's concern that electricity has been recognized as a serious workplace hazard, exposing employees to such dangers as electrical shock, electrocution, fires and explosions.

OSHA's electrical safety regulations recognize two key hazard management tactics: elimination of the hazard through shut down and isolation (Lock-Out/Tag-Out); or when live circuits must be maintained there should be contact protection through the use of guarding, insulation, and protective equipment.

The NFPA defined many of the design and installation parameters associated with electrical systems, as well as PPE that must be worn in potential arc-flash areas.

1.3 ACTIVITIES

Construction activities frequently impact electrical systems as part of the assigned project, such activities are but not limited to:

- Installation or alterations of electrical systems, components, machinery and equipment.
- Maintenance of existing systems and equipment.
- Demolition of existing systems.
- Temporary planned outrages.
- Tests and diagnostics.

1.4 RESPONSIBILITIES

Prior, during and post activities that potentially impact electrical system components and energized or non-energized machinery, equipment, parts, or systems, the following shall be taken into account by Contractors:

1) Contractors shall hire only qualified electricians to work on electrical systems and equipment that use or control electrical power and ensure all work is performed in accordance with the guidelines of federal and local regulations.
2) Contractors are to identify any potential sources of electrical energy likely to cause death, injury, or serious physical harm to employees.

3) Contractors are to notify Facilities Management of any impact activities prior to the start of the project.
4) Coordinate any planned outages with NSU Facilities Management department.
5) Contractors must identify and document competent and qualified employees who are properly trained and licensed, in addition ensure all employees performing impact duties have received sufficient training in compliance with federal and local regulations.
6) Contractors shall perform all permanent and temporary electrical work in accordance with NFPA 70E Standard for Electrical Safety in the Workplace and applicable OSHA general industry or construction standards.
7) Contractors shall erect barriers and post warning signs to alert non-authorized employees and NSU population to stay out and clear of the work area.
8) Contractors shall use ground fault circuit interrupters (GFCIs) with all power tools and equipment, in addition all 120 volt, single phase, 15 & 20 amp temporary power circuits shall have GFCI's.
9) Contractors installing electrical service will label circuit breakers and disconnect panels for their purpose. Proper PPE, including arc-flash protection shall be worn.
10) Cords and feeders shall be of sufficient rating to transmit power required by tools and equipment. All electric power tools shall be inspected for proper grounding and overall condition prior to use.
11) Contractors are not permitted to use damaged or defective electrical cords on NSU property.
12) Contractors are not permitted to run cords through holes in walls, ceilings, floors, or other openings. Cords may not be secured with staples, nails or wire.
13) In the event, a circuit breaker "trips" or a fuse is blown, the contractor shall ensure that a qualified electrician checks the circuit and corrects the problem before the circuit is reenergized.
14) Follow Lock-Out/Tag-Out procedures when working with de-energized equipment or circuits.
15) Electrical equipment including extension cords to be used in stacks, tanks, or other areas where flammable vapors or explosive atmospheres may be present require approval in accordance with the provisions of the National Electrical Code for Hazardous Locations.
16) All equipment and circuits involved in the scope of work should be de-energized prior to the start of any work, whenever possible.
17) When workers are required to work on energized lines and equipment, they must use rubber gloves and other protective equipment and/or use hotline tools meeting the provisions of ANSI and NFPA 70E. At least two persons must be assigned to work on the energized lines.
18) Transformer banks and high voltage equipment shall be protected from unauthorized access, with warning signs posted at the entrances or surrounding area.
19) Wiring shall be installed so as to avoid sharp corners and edges, projections, and/or pinching.
20) ONLY temporary or short-term use of extension cords. Extension cords shall be heavy duty with three-prong grounding type plugs and receptacles. Extension cords must be used in such a way as not to create a tripping hazard.

21) Electrical panel covers shall be installed and in place at all times prior to and upon completion of the project.
22) All circuits shall be marked for voltage and area of service.
23) Frayed or cut electrical cords, or cords with damaged plugs or missing ground plugs shall be immediately removed from service, rendered unusable and removed from the job site. Defective tools cannot be stored in tool boxes on the job site.
24) Cords and welding leads shall be rolled up at the end of each day.
25) Welding electrode connections require covers.
26) Only explosion-proof lightning shall be acceptable for usage in confined spaces,
27) All switches shall be enclosed and grounded.
28) Temporary area lighting if necessary must be powered by its own circuit.
29) Temporary lighting fixtures shall be hung from the insulated grommet attached to the fixture and not by the cord or conductors. Fixtures cannot be hung from fire sprinkler or water piping, or ceiling grids.
30) All temporary power or electrical systems shall be removed at the conclusion of the project.
31) Overhead power lines extending over the work area shall be clearly marked and shielded, especially if cranes, material hoists, aerial lifts, excavators, or similar equipment will be operated in the area.
32) Insulating gloves, hot sticks and shielding blankets must be tested and certified in accordance with applicable ASTM standards and documented.
33) Workspace required to access and service electrical systems shall not be used for storage.
34) No grounded conductor may be attached to any terminal or lead so as to reverse polarity. Verify polarity when using double-insulated tools.
35) Electrical tie-ins shall be conducted only on de-energized systems.
36) At least one member of the Contractor's staff must have a valid CPR certification.
37) After completion of all repairs, maintenance or installation of electrical systems and equipment, the Contractor must verify that no electrical hazards exist and all electrical components are operationally intact before attempts to re-energize shall occur.

1.5 REGULATIONS

OSHA 29 CFR 1910. 301 – 399	Electrical Standard
OSHA 29 CFR 1926, Subpart K	Electrical
OSHA 29 CFR 1910.137	Electrical Protective Devices
OSHA 29 CFR 1910, Subpart I	Personal Protective Equipment
NFPA 70	National Electrical Code
ASTM Standards	
ANSI Standards	

1.6 ACCOUNTABILITY

All contactors will be responsible for complying with the guidelines as described above. Contractors are to communicate to their employees and Subcontractors all the guidelines and relevant information. All work shall be performed in accordance with University policies and procedures as well as all applicable laws and regulations.