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Gallant Builders (Gallant) has implemented this safety program (program) for electrical safety and complies with Title29 Code of Federal Regulations (CFR) §1910 Subpart S, and the National Electrical Code (NEC).

I. PURPOSE

The purpose of this program is to define the procedures and standards that apply when employees are working on or around equipment that contains electrical hazards.

II. APPLICABILITY

This program applies to all employees who are required to work on or around equipment that contain electrical hazards.

III. PURPOSE

To establish the procedures that shall be followed in the safe performance of work activities involving general electrical hazards. Employees who face a risk of electrical shock or related injuries shall be trained in the appropriate electrical safety work practices. In addition, employees that work around, but not on, electrical systems shall be trained in the hazards associated with electricity.

The Safety Director has developed this Program to:

- Assure that departments understand and comply with the regulatory requirements related to electrical work;
- Assure the safety of employees who may work in the vicinity of, or on, electrical systems; and
- Assure that all departments that perform electrical work follow uniform work practices.

IV. APPLICATION

The Safety Director will periodically review the effectiveness of this program. If deficiencies are found with the program or employee training, the program and/or training will be modified to address these deficiencies.

V. SCOPE

This program applies to all GALLANT properties and all electrical work performed by Gallant employees regardless of jobsite location. All employees who face a risk of electrical shock, burns or related injuries must be trained in electrical safety work practices. These work practices must always be followed. In addition, employees that work around, but not on, electrical systems must be trained in the inherent danger of electricity. This Program describes work practices for both ***qualified*** and ***unqualified*** persons.

Qualified Persons - are those who have received specific training and have demonstrated the skills necessary to work safely on or near exposed energized parts. A person may be qualified to work, for example, on circuits up to 600 volts, but may be unqualified to work on higher voltages. Only qualified persons may place or remove locks and tags on energized electrical systems

Unqualified Persons - are those with little or no such training.

An employee undergoing on-the-job training who has demonstrated the ability to perform duties safely at his or her level of training, and who is under the direct supervision of a qualified person, is considered to be a qualified person for the purpose of those duties.

Work practices covered by this Program include persons working on or near:

- Premises wiring installations of electric conductors and equipment in or on buildings or other structures, and in other areas such as yards, parking and other lots and industrial substations.
- Wiring for connection to supply: Installations of conductors that connect to the supply of electricity.
- Other wiring: Installation of other outside conductors on the premises.
- Optical fiber cable: Installation of optical fiber cable near or with electric wiring.

Work practices covered by this Program also include work performed by ***unqualified*** persons near or with electric power generation, transmission, and distribution installations, communications installations, installations in vehicles, and railway equipment.
This Program does not apply to:

- Work performed by ***qualified*** persons on or directly associated with electric power generation, transmission, and distribution, including the repair of overhead or underground distribution lines, line clearance tree trimming and utility pole replacement.
- Work in a generating plant where the electric circuits are commingled with power generation equipment or circuits and where there is exposure to high voltage or lack of overcurrent protection.
- Communication installations

VI. RESPONSIBILITIES

The Safety Director is responsible for developing, implementing, and administering this Program. This involves:

- Training supervisors/designated departmental program coordinators and their employees.
- Maintaining centralized records of training, energy control procedures, and inspection data and reports.
- Providing technical assistance to Gallant employees.
- Developing and maintaining the Program, training programs and other training resources that can be used by Gallant employees.
- Evaluating the overall effectiveness of this Program on a periodic basis.

VII. TRAINING

Employees who face a risk of electrical shock that is not reduced to a safe level by the electrical installation (e.g., systems that meet the National Electrical Code and OSHA requirements) must be trained per the requirements of this Program.

Employees do not require training if their work does not bring them close enough to exposed parts of electric circuit operating at 50 volts or more to ground—for a hazard to exist.

Qualified Persons working on or near exposed energized parts must receive training in the following:

- The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment;
- The skills and techniques necessary to determine the nominal voltage of exposed live parts; and,
- The clearance distances specified for working on or near exposed energized parts and the corresponding voltages to which the qualified person will be exposed.

Qualified Persons whose work on energized equipment involves either direct contact, or contact by means of tools or materials, must be trained on how to work safely on energized circuits.

These employees must be familiar with proper precautionary work practices, personal protective equipment, insulating and shielding materials, and the use of insulated tools.

The training for qualified and unqualified employees will involve both classroom and on-the-job training. This training will be coordinated between the Safety Director and the supervisor and customized to reflect the scope of work performed within that work unit. The work unit supervisor will review, or coordinate the review, of the work performed by each employee to assure that they demonstrate the skills and techniques needed to perform their work safely.

- Training must be performed before the employee is assigned duties involving work around or on electrical systems.
- Retraining will be performed whenever inspections performed by the Safety Director or the employee's supervisor indicate that an employee does not have the necessary knowledge or skills to safely work on or around electrical systems. Retraining will also be performed when policies or procedures change and/or new equipment or systems are introduced into the work area.

VIII. ELECTRICAL INSTALLATION REQUIREMENTS

FREE FROM RECOGNIZED HAZARDS

Electrical equipment must be free from recognized hazards that are likely to cause death or serious physical harm. Equipment must be suitable for the installation and use, and must be installed and maintained in accordance with the manufacturer's instructions, the National Electrical Code (NEC) and OSHA. "Suitable" means that the equipment is listed or labeled for the intended use by a nationally recognized testing laboratory such as Factory Mutual (FM) or Underwriters Laboratory (UL).

LABELING OF DISCONNECTS

Each disconnecting means—the switch or device used to disconnect the circuit from the power source—must be clearly labeled to indicate the circuit's function unless it is located and arranged so the purpose is evident. Identification should be specific rather than general; a branch circuit serving receptacles in a main office should be labeled as such, not simply labeled "receptacles". All labels and marking must be durable enough to withstand the environment to which they may be exposed.

GUARDING OF LIVE PARTS

Live parts of electric equipment operating at 50 volts or more must be guarded against accidental contact. Proper guarding can be achieved by use of an approved cabinet or other approved enclosure, by location in a room or vault that is accessible to qualified persons only, or by elevating the equipment or controlling the arrangement of the space to prevent contact by unqualified persons. If electric equipment is located in an area where it is potentially exposed to physical damage, the enclosure or guard must be of sufficient strength to prevent such damage.

IX. GENERAL WIRING DESIGN AND PROTECTION

New electrical wiring, and the modification, extension or replacement of existing wiring must conform to the requirements of the NEC and OSHA and the following:

- No grounded conductor may be attached to any terminal or lead so as to reverse designated polarity.
- The grounding terminal or grounding-type device on receptacles, cord connector, or attachment plug may not be used for any purpose other than grounding.
- Conductors and equipment must be protected from overcurrent above their safe current carrying capacity.
- All AC systems of 50 to 1,000 volts must normally be grounded as required by the NEC and OSHA. The path to ground from circuits, equipment and enclosures must be permanent and continuous. Existing ungrounded premises wiring does not meet the OSHA requirements and must be replaced or modified as needed to meet this requirement. For information on exceptions to these requirements, please contact the Safety Director.
- Conductors entering boxes, cabinets or fittings must be protected from abrasion, and openings through which conductors enter must be effectively closed. Unused openings in cabinets, boxes and fixtures must also be effectively closed.
- All pull boxes, junction boxes and fittings must be provided with covers approved for the purpose. If metal covers are used they must be grounded. In completed installations, each outlet box must have a cover faceplate or fixture canopy. Pull boxes and junction boxes for systems over 600 volts, nominal, must provide complete enclosure, the boxes must be closed by suitable covers securely fastened in place, and the cover must be permanently marked “High Voltage”.
- Switchboards and panelboards that have exposed live parts must be located in permanently dry locations and accessible to qualified persons only. Panelboards must be mounted in cabinets, cutout boxes or other approved enclosure, and must be dead front unless accessible to qualified persons only. Exposed blades of knife switches must be dead when open. Receptacles installed in damp or wet locations must be suitable for the location.
- Cabinets, cutout boxes, fittings, boxes and panelboard enclosures in damp or wet locations must be installed so as to prevent moisture or water from entering and accumulating within the enclosure. In wet locations the enclosures must be weatherproof.
- Fixtures, lamp holders, lamps, rosettes, and receptacles may have no live parts normally exposed to employee contact.
- Screw-base light socket adapters do not maintain ground continuity and may not be used.
- Multi-plug receptacle adapters may not maintain ground continuity or may overload circuits and must not be used. If additional receptacles are needed in a work location, additional circuits and/or receptacles must be installed. Multi-plug power strips with overcurrent protection are acceptable for use with electronic equipment if they are used to reduce line noise or to provide surge or overcurrent protection. All multi-plug adapters shall be UL labeled and approved.

- Electrical equipment, wiring methods and installations of equipment in hazardous classified locations must be intrinsically safe, approved for the location, or safe for the location. Hazardous classified locations are areas where flammable liquids, gases, vapor, or combustible dusts or fibers exist or could exist in sufficient quantities to produce an explosion or fire.

X. REQUIREMENTS FOR TEMPORARY WIRING

Temporary electrical power and lighting installations 600 volts or less, including flexible cords, cables and extension cords, may only be used during and for renovation, maintenance, repair, or experimental work. Temporary wiring may also be used for decorative lighting for special events and similar purposes for a period not to exceed 90 days. The following additional requirements apply:

Ground-fault protection (e.g., ground-fault circuit interrupters, or GFCI) must be provided on all temporary-wiring circuits, including extension cords, used on construction sites.

In general, all equipment and tools connected by cord and plug must be grounded. Listed or labeled double insulated tools and appliances need not be grounded. For information on exceptions to these requirements, please contact the Safety Director.

Feeders must originate in an approved distribution center, such as a panelboard, that is rated for the voltages and currents the system is expected to carry.

Branch circuits must originate in an approved power outlet or panelboard.
Neither bare conductors nor earth returns may be used for the wiring of any temporary circuit.

Receptacles must be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit must contain a separate equipment-grounding conductor, and all receptacles must be electrically connected to the grounding conductor.

Flexible cords and cables must be of an approved type and suitable for the location and intended use. They may only be used for pendants, wiring of fixtures, connection of portable lamps or appliances, elevators, hoists, connection of stationary equipment where frequently interchanged, prevention of transmission of noise or vibration, data processing cables, or where needed to permit maintenance or repair. They may not be used as a substitute for the fixed wiring, where run through holes in walls, ceilings or floors, where run through doorways, windows or similar openings, where attached to building surfaces, or where concealed behind building walls, ceilings or floors.

Suitable disconnecting switches or plug connects must be installed to permit the disconnection of all ungrounded conductors of each temporary circuit.
Lamps for general illumination must be protected from accidental contact or damage, either by elevating the fixture or by providing a suitable guard. Hand lamps supplied by flexible cord must be equipped with a handle of molded composition or other approved material and must be equipped with a substantial bulb guard.
Flexible cords and cables must be protected from accidental damage. Sharp corners and projections are to be avoided. Flexible cords and cables must be protected from damage when they pass through doorways or other pinch points.

XI. OPEN CONDUCTORS, CLEARANCE FROM GROUND

Open conductors must be located at least 10 feet above any finished grade, sidewalk or projection, 12 feet above areas subject to non-truck traffic, 15 feet above areas subject to truck traffic, and 18 feet above public streets, roads or driveways.

XII. ENTRANCES AND ACCESS TO WORKSPACE

In any workspace where there is electric equipment operating at over 600 volts, there must be at least one entrance at least 24 inches wide and 6 feet, 6 inches high to permit escape in the event of an emergency. Any exposed energized conductors operating at any voltage and located near the entrance must be guarded to prevent accidental contact. Any insulated energized conductors operating at over 600 volts and located next to the entrance must also be guarded.

XIII. WORKING SPACE ABOUT ELECTRIC EQUIPMENT

Sufficient access and working space must be provided and maintained around all electric equipment to permit ready and safe operation and maintenance of the equipment.
Working clearances may not be less than 30 inches in front of electric equipment. Except as permitted by OSHA or the NEC, the working space in front of live parts operating at 600 volts or less that require servicing, inspection or maintenance while energized may not be less than indicated in Table 1. This working space may not be used for storage.

TABLE 1-Working Clearances

Nominal Voltage to Ground	Minimum Clear Distance for Condition [3]		
	A	B	C
0-150	3' [1]	3' [1]	3'
151-600	3' [1]	3-1/2'	4'
601-2,500	3'	4'	5'
2,501-9,000	4'	5'	6'
9,001-25,000	5'	6'	9'
25,001-75 kV [2]	6'	8'	10'
above 75 kV [2]	8'	10'	12'

(1) Minimum clear distance may be 2-1/2' for installations built prior to April 16, 1981.
(2) Minimum clear distance in front of electrical equipment with nominal voltage to ground above 25 kV may be the same as for 25 kV under conditions A, B and C for installations built prior to April 16, 1981.
(3) Conditions A, B and C are as follows: (A) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides are effectively guarded by an insulating material. Insulated wire or insulated bus bars operating at not over 300 volts are not considered live parts. Concrete, brick or tile walls are considered grounded. (B) Exposed live parts on one side and grounded parts on the other. (C) Exposed live parts on both sides of the workspace not guarded as per condition

(A), with the operator between.

XIV. SELECTION AND USE OF WORK PRACTICES

The work practices used by an employee must be sufficient to prevent electric shock or other injuries that could result from either direct or indirect electrical contact. These work practices must be used when work is performed near or on equipment or circuits that are or may be energized. The work practices used must be consistent with the nature and extent of the electrical hazard.

XV. WORKING ON ELECTRICAL SYSTEMS

Energized Parts: Only qualified employees are allowed to work on electric parts or equipment that has not been de-energized using approved lockout/tagout procedures. Live parts to which an employee may be exposed will be de-energized before the employee works on or near them, unless:

- De-energizing introduces additional or increased hazards. Examples of "additional or increased" hazards include interruption of life support equipment, deactivation of emergency alarm systems, shutdown of fume hood ventilation systems, or removal of illumination for an area.
- De-energizing is not possible due to equipment design or operational limitations. Examples include testing that can only be performed with the electrical circuit energized, and work on circuits that form an integral part of a continuous process that would need to be completely shut down in order to permit work on one circuit or piece of equipment.
- Live parts operate at less than 50 volts to ground and there is no increased exposure to electrical burns or to explosion due to electric arcs.

If de-energizing exposed live parts could add to or increase the hazard or is not possible, then other approved work practices must be used to protect employees who may be exposed to the electrical hazards. The work practices used must protect employees from contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object. The work practices used must be suitable for the conditions under which the work is performed and for the voltages of exposed electric conductors or circuit parts.

XVI. WORKING ON OR NEAR EXPOSED DE-ENERGIZED PARTS

When employees work on exposed de-energized parts or near enough to them to expose the employee to an electrical hazard, then the following safety-related work practices will be followed.

- Any conductors or parts of electric equipment that have not been properly locked and/or tagged out must be treated as energized even if these systems have been de-energized.
- If the potential exists for an employee to contact parts of fixed electric equipment or circuits that have been de-energized, the circuits energizing the parts must be locked and/or tagged out. Locking and tagging procedures must comply with the Gallant *Lockout/Tagout Program* and the requirements outlined in this Program.

XVII. DE-ENERGIZING EQUIPMENT

- Safe procedures for de-energizing circuits and equipment will be determined by a qualified worker before the circuit or equipment is de-energized.

- Circuits and equipment to be worked on will be disconnected by the worker from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks will not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.
- Stored electrical energy that might endanger personnel must be released prior to the work. This might include, for example, discharging capacitors and transformers, and short-circuiting and grounding high capacitance elements. If the capacitors or associated equipment are handled during this work, they must be treated as energized.
- Stored non-electrical energy (for example, hydraulic or pneumatic) in devices that could reenergize electric circuit parts must be blocked or relieved so that circuit parts cannot be accidentally re-energized by the device.
- A lock and tag must be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be done. The lock must be attached so as to prevent persons from re-energizing the circuit unless they resort to undue force or the use of tools.

XVIII. VERIFICATION OF DE-ENERGIZED CONDITION

The following requirements must be met before any circuit or equipment is considered de-energized or may be worked on as de-energized.

- A qualified person must activate the equipment operating controls or use other methods to verify that the equipment cannot be restarted.
- A qualified person must use test equipment to ensure that electrical parts and circuit elements are de-energized. The test must confirm there is no energized condition from induced voltage or voltage backfeed.
- Test equipment and instruments must be visually inspected for external defects or damage before being used to verify that the equipment or circuit is de-energized.
- When voltage over 600 volts nominal are tested, the test equipment must be checked for proper operation immediately before and after the test.

XIX. RE-ENERGIZING EQUIPMENT

In addition to the requirements of the Lockout/Tagout Program, the following requirements must be met, in the order given, before circuits or equipment are re-energized, even temporarily:

APPROACH DISTANCES FOR QUALIFIED PERSONS EXPOSED TO ALTERNATING CURRENT	
Voltage Range (phase-to-phase)	**Minimum Approach Distance**
300 V and less	Avoid contact
Over 300 V, not over 750 V	1 ft. 0 in.
Over 750 V, not over 2 kV	1 ft. 6 in.
Over 2 kV, not over 15 kV	2 ft. 0 in.
Over 15 kV, not over 37 kV	3 ft. 0 in.
Over 37 kV, no over 87.5 kV	3 ft. 6 in.
Over 87.5 kV, not over 121 kV	4 ft. 0 in.
Over 121 kV, not over 140 kV	4 ft. 6 in.

- A qualified person must conduct tests and visual inspections as necessary to verify that all tools, electrical jumpers, shorts, grounds and other such devices have been removed so that circuits and equipment can be safely energized;
- Employees potentially exposed to the hazards of re-energizing the circuit must be warned to stay clear; and,
- Each employee removes his or her lock(s) and tag(s).

XX. OVERHEAD POWER LINES

When work is to be performed near overhead lines, the lines must be de-energized and grounded. Arrangements must be made with the organization that operates or controls the electric circuits when lines are to be de-energized and grounded.

If this is not possible to de-energize and ground overhead lines, then other protective measures, such as guarding, isolating or insulating, must be taken before the work is started. These protective measures must prevent direct contact by the qualified person or indirect contact through conductive materials, tools, or equipment. Only qualified persons from the power distribution company are allowed to install insulating devices on overhead power transmission and distribution lines. All other persons, and any conductive object used by these employees, may not approach closer than the minimum distance specified in Table 1 when working in an elevated location near unguarded, energized overhead lines. Unqualified persons working on the ground are not allowed to bring any conductive object or any insulated object that does not have the proper insulating rating closer to unguarded, energized overhead lines than the distance allowed in Table 2.

TABLE 2

Voltage to Ground	Minimum Approach Distance
50 kV or less	10 feet
Over 50 kV	10 feet + 4 inches for every 10 kV over 50 kV

Qualified employees working in the vicinity of overhead lines, whether in an elevated position or on the ground, are not allowed to approach or take any conductive object without an approved insulating handle closer to exposed energized parts than allowed in Table 3 unless:

- The person is insulated from the energized part by using gloves, with sleeves if necessary, rated for the voltage involved; or
- The energized part is insulated from all other conductive objects at a different potential and from the person; or
- The person is insulated from all conductive objects at a potential different from the energized part.

TABLE 3

XXI. VEHICLES and MECHANICAL EQUIPMENT

A minimum clearance of 10 feet must be maintained between energized overhead lines and all vehicles or mechanical equipment capable of having parts or its structure elevated (e.g., cranes, mobile scaffolds, elevating platforms, dump trucks, lift trucks, and flatbed trailer cranes). If the voltage of the overhead line is greater than 50 kV, the clearance must be increased by 4 inches for every 10 kV over 50 kV.

The clearance requirement may be reduced if:

- The vehicle is in transit with its structure lowered. The clearance may be reduced to 4 feet when near energized lines operating at less than 50 kV, or 4 ft. plus 4 inches for every 10 kV over 50 kV.

- Insulating barriers are installed to prevent contact with the lines and the barriers are rated for the voltage of the line being guarded. The barrier may not be part of an attachment to the vehicle or its raised structure. The clearance may be reduced to the distance allowed by the design of the insulating barrier.
- The equipment is an aerial lift insulated for the voltage involved and a qualified person performs the work. The clearance between the uninsulated portion of the lift and the power line may be reduced to the distance given in Table 3.

Persons working on the ground are not allowed to contact the vehicle or mechanical equipment or any of its attachments, unless:

The person uses protective equipment rated for the voltage; or the equipment is located so that no uninsulated part of its structure can provide a conductive path to persons on the ground. Equipment shall not approach closer to the line than 10 feet for voltages less than 50 kV, or 10 feet plus 4 inches for every 10 kV over 50 kV.

When any vehicle or mechanical equipment is intentionally grounded, persons may not stand near the point of grounding when there is any possibility of contact with overhead energized lines. Additional precautions (e.g., such as the use of barricades or insulation) must be taken as necessary to protect persons from hazardous ground potentials that can develop within a few feet or more outward from the grounding point.

XXII. ILLUMINATION

Employees shall not enter spaces containing exposed energized parts unless there is sufficient illumination for them to perform the work safely.

Employees may not perform tasks near exposed energized parts where there is lack of illumination or an obstruction that blocks his or her view of the work to be performed. Do not reach blindly into areas that may contain energized parts.

XXIII. CONFINED OR ENCLOSED WORK SPACES

Employees working in manholes, vaults or similar confined or enclosed spaces that contain exposed energized parts must be provided with, and must use, protective shields, protective barriers, or insulating materials as needed to prevent inadvertent contact with these energized parts.

Doors and hinged panels that could swing into an employee and cause him or her to contact exposed energized parts must be secured before work begins.

Work performed within confined or enclosed spaces must comply with the GALLANT C*onfined Space Entry Program*.

XXIV. CONDUCTIVE MATERIALS and EQUIPMENT

Conductive materials and equipment that are in contact with any part of an employees' body must be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts.

If an employee must handle long conductive objects, such as metal ducts, pipes, or rods, in areas with exposed

live parts, then insulation, guarding and/or approved materials handling techniques must be used which will minimize the hazard.

Portable Ladders. A portable ladder used where there is potential for contact with exposed energized parts must have nonconductive side rails.
Conductive Apparel. Employees may not wear conductive articles of jewelry and clothing, such as watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear, if they might contact exposed energized parts.

XXV. HOUSEKEEPING

Housekeeping duties may not be performed close to live parts unless adequate safeguards, such as insulating equipment or barriers, are provided.

Electrically conductive cleaning materials, including steel wool, metalized cloth and silicon carbide, as well as conductive liquid solutions, may not be used near energized parts unless procedures are followed which prevent electrical contact.

XXVI. INTERLOCKS

Only qualified persons are allowed to bypass electrical safety interlocks, and then only temporarily while an employee is working on the equipment. This work must comply with the specified procedures for working on or near exposed energized parts. The interlock system must be returned to its operable condition when the work is completed.

XXVII. PORTABLE ELECTRICAL EQUIPMENT and EXTENSION CORDS

The following requirements apply to the use of cord-and-plug-connected equipment and flexible cord sets (extension cords):

- Extension cords may only be used to provide temporary power.
- Portable cord-and-plug connected equipment and extension cords must be visually inspected before use on any shift for external defects such as loose parts, deformed and missing pins, or damage to outer jacket or insulation, and for possible internal damage such as pinched or crushed outer jacket. Any defective cord or cord-and-plug-connected equipment shall be removed from service and no person may use it until it is repaired and tested to ensure it is safe for use.
- Extension cords must be of the three-wire type. Extension cords and flexible cords must be designed for hard or extra hard usage (for example, types S, ST, and SO). The rating or approval must be visible.
- Personnel performing work on renovation or construction sites using extension cords or where work is performed in damp or wet locations must be provided, and shall use, a ground-fault circuit interrupter (GFCI).
- Portable equipment must be handled in a manner that will not cause damage. Flexible electric cords connected to equipment may not be used for raising or lowering the equipment.
- Extension cords must be protected from damage. Sharp corners and projects must be avoided. Flexible cords may not be run through windows or doors unless protected from damage, and then only on a temporary basis. Flexible cords may not be run above ceilings or inside or through walls, ceilings or floors,

and may not to be fastened with staples or otherwise hung in such a fashion as to damage the outer jacket or insulation.

- A cord protector or tape must cover cords when they extend into a walkway or other path of travel to avoid creating a trip hazard.
- Extension cords used with grounding-type equipment must contain an equipment-grounding conductor (i.e., the cord must accept a three-prong, or grounded, plug).
- Attachment plugs and receptacles may not be connected or altered in any way that would interrupt the continuity of the equipment-grounding conductor. Additionally, these devices may not be altered to allow the grounding pole to be inserted into current connector slots. Clipping the grounding prong from an electrical plug is prohibited.
- Flexible cords may only be plugged into grounded receptacles. The continuity of the ground in a two-prong outlet must be verified before use with a flexible cord, and it is recommended that the receptacle be replaced with a three-prong outlet. Adapters that interrupt the continuity of the equipment grounding connection may not be used.
- All portable electric equipment and flexible cords used in highly conductive work locations, such as those with water or other conductive liquids, or in places where employees are likely to contact water or conductive liquids, must be approved for those locations.
- Employee's hands must not be wet when plugging and unplugging flexible cords and cord-and-plug-connected equipment if energized equipment is involved.
- If the connection could provide a conducting path to employee's hands (for example, if a cord connector is wet from being immersed in water), the energized plug and receptacle connections must be handled only with insulating protective equipment.
- Locking-type connectors must be properly locked into the connector.
- Lamps for general illumination must be protected from breakage with a protective cage and metal shell sockets must be grounded.
- Temporary light must be protected from breakage using a protective cage.
- Temporary lights must not be suspended by their cords unless they have been designed for this purpose.
- Portable lighting used in wet or conductive locations, such as tanks or boilers, must be operated at no more than 12 volts or must be protected by GFCI's.
- Extension cords are considered to be temporary wiring, and must also comply with the section on "Requirements for Temporary Wiring" in this Program.

XXVIII. ELECTRIC POWER and LIGHTING CIRCUTS

Routine Opening and Closing of Circuits - Load rated switches, circuit breakers, or other devices specifically designed as disconnecting means must be used for the opening, reversing, or closing of circuits under load conditions. Cable connectors not of the load-break type, fuses, terminal lugs, and cable splice connections may not be used for opening, reversing, or closing circuits under load conditions except in an emergency.

Re-closing Circuits After A Protective Device Operates
After a circuit is de-energized by a circuit protective device (e.g., circuit breaker or similar), the circuit may not be manually re-energized until it has been determined that the equipment and circuit can be safely energized. The repetitive manual re-closing of circuit breakers or re-energizing circuits by replacing fuses without verifying that the circuit can be safely energized is prohibited.

When it can be determined that the overcurrent device operated because of an overload rather than a fault

condition, no examination of the circuit or connected equipment is needed before the circuit is re-energized.

Overcurrent protection of circuits and conductors may not be modified even on a temporary basis.

TEST EQUIPMENT and INSTRUMENTS
Only qualified persons may perform testing work on electric circuits or equipment. Test instruments and equipment (including all associated test leads, cables, power cords, probes and connectors) must be visually inspected for external defects and damage before the equipment is used. If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item must be tagged out of service. The device may not be returned to service until it has been repaired and tested safe for use.

Test instruments, equipment, and their accessories must be rated for the circuits and equipment to which they will be connected and designed for the environment in which they will be used.

XXIX. FLAMMABLE or IGNITABLE MATERIALS

Where flammable or ignitable materials are present, do not use electric equipment capable of igniting them unless measures are taken to prevent hazardous conditions from developing. Flammable and ignitable materials include, but are not limited to, flammable gases, vapors, or liquids, combustible dust, and ignitable fibers or filings. Equipment that is intrinsically safe for the hazardous condition may be used.

XXX. SAFEGUARDS for PERSONNEL PROTECTION

Protective Equipment
Employees working in areas where there are potential electrical hazards must be provided with, and must use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed. The department must provide electrical safety-related personal protective equipment required by this program at no cost to the employee. The requirements for general purpose gloves, respirators, hearing protection, fall protection, and electrical protective headwear and footwear may be found in the Gallant *Personal Protective Equipment Program*; a copy of this Program may be obtained from the Safety Director.

Workmanship and Finish: Rubber insulating equipment must meet the American Society of Testing and Materials (ASTM) standards D120-87, D178-93, D1048-93, D1049-93, D1050-90 or D1051-87 as applicable. Manufactured equipment, which does not indicate compliance with these ASTM standards, must be tested using the a-c and d-c proof tests and related procedures as described in these ASTM standards.

Blankets, gloves and sleeves must be produced by a seamless process. Insulating blankets, matting, covers, lines, hoses, gloves, and sleeves made of rubber must be marked to indicate the class of equipment (e.g., Class 0 equipment must be marked Class 0, Class 1 marked Class 1, and so forth). Non-ozone-resistant equipment other than matting must be marked Type I. Ozone-resistant equipment other than matting shall be marked Type II. Markings must be nonconductive and must be applied in a way that will not damage the insulating qualities. Markings on gloves must be confined to the cuff portion of the glove.

Equipment must be free of harmful physical irregularities. Surface irregularities (e.g., indentions, protuberances, or imbedded foreign materials) may be present on rubber goods because of imperfections on forms or molds or because of manufacturing difficulties. These surface irregularities are acceptable under the following conditions:

- The indention or part that sticks out blends into a smooth slope when the material is stretched, or

- The foreign material remains in place when the insulating material is folded and stretches with the insulating material surrounding it.

In-service care and use: The department must make certain that electrical protective equipment is maintained in a safe, reliable condition, and that the following requirements are met:

Maximum use voltages for rubber protective equipment must conform to those listed in Table 4.

TABLE 4

XXXI. RUBBER INSULATING EQUIPMENT, MAXIMUM USE VOLTAGE

Class of Equipment	Maximum use voltage[1] a-c --rms
0	1,000
1	7,500
2	17,000
3	26,500
4	36,000

[1] The maximum use voltage is the ac voltage (rms) classification of the protective equipment that designates the maximum nominal voltage of the energized system that may be safety worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design voltage:
If there is no multiphase exposure in a system area and if the voltage is limited to the phase-to-ground potential, or
⇒ If the electrical equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wire circuit is removed.

- Insulating equipment shall be inspected for damage before each day's use and immediately following any incident that could have caused damage.
- An air test must be performed on rubber insulating gloves before use.
- Insulating equipment with a hole, tear, puncture or cut, ozone cutting or checking, an embedded foreign object, any change in texture including swelling, softening, hardening, or becoming sticky or inelastic, or any other defect that could damage the insulating property shall not be used.
- All protective equipment must be used and maintained in accordance with the manufacturer's instructions.
- Insulating equipment found to have defects that might affect its insulating properties must be removed from service until electrical tests have been performed that indicate it is acceptable for continued use.
- Where the insulating capability of protective equipment is subject to damage during use, an outer covering of leather or other appropriate material shall protect the insulating material.
- Rubber insulating equipment shall be tested on a schedule as shown in Table 5.

TABLE 5

XXXII. RUBBER INSULATING EQUIPMENT TEST INTERVALS

Type of Equipment	When to Test
Rubber insulating line hose	Upon indication that the insulating value is suspect
Rubber insulating covers	Upon indication that insulating value is suspect
Rubber insulating blankets	Before first issue and every 12 months thereafter
Rubber insulating gloves	Before first issue and every 6 months thereafter
Rubber insulating sleeves	Before first issue and every 12 months thereafter

If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.

Employees shall clean insulating equipment as needed to remove foreign substances, and to store insulating equipment where it is protected from light, temperature extremes, excessive humidity, ozone, and other substances and conditions that may cause damage. Employees shall visually examine their gloves prior to each use and to avoid handling sharp objects.

Protector gloves must be worn over insulating gloves except as follows:

- Protector gloves need not be used with Class 0 gloves, under limited-use conditions, where small equipment and parts manipulation require unusually high finger dexterity.
- Any other class of glove may be used for similar work without protector gloves if it is demonstrated that the possibility of physical damage to the gloves is small and if the class of glove is one class higher than that required for the voltage involved. Insulating gloves that have been used without protector gloves may not be used at a higher voltage until they have been electrically tested.

The department must ensure that employees do not use insulating equipment that fails to pass visual inspections or electrical tests except as follows:

- Rubber insulating line hose may be used in shorter lengths if the defective portion is cut off.
- Rubber insulating blankets may be repaired with a compatible patch as long as the physical and electrical properties equal or exceed those of the blanket.
- Rubber insulated blankets may be salvaged by cutting and removing the defective area from the undamaged portion of the blanket if the undamaged area remaining is greater than 22 inches by 22 inches for Class 1, 2, 3 and 4 blankets.
- Rubber insulating gloves and sleeves with minor physical defects, such as small cuts, tears or punctures may be repaired by application of a patch with the same electrical and physical properties as the surrounding material.
- Rubber insulating gloves and sleeves with minor surface blemishes may be repaired with a compatible liquid compound.

- Repairs to gloves are permitted only in the area between the wrist and reinforced edge of the opening.

Repaired insulating equipment must be retested before it may be returned to service. These tests must be documented in writing, and indicate the type(s) of test(s) performed, equipment tested (specifically by referencing an applied marking, serial number or similar), date, name of tester, and the results of the tests. These test results must be maintained in a permanent log.

XXXIII. GENERAL PROTECTIVE EQUIPMENT and TOOLS

Nonconductive head protection shall be worn whenever there is danger of head injury from electric shock or burn due to contact with exposed energized parts.

Protective equipment for the eyes and/or face shall be worn whenever there is danger of injury to the eyes or face from electric arcs, flashes or flying objects resulting from electrical explosion.

Employees working near exposed energized conductors or circuit parts if the tools or handling equipment might make contact with such conductors or parts shall use insulated tools or handling equipment.

If the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material shall be protected.

Protective shields, protective barriers, or insulating materials shall be used to protect each employee from shock, burns, or other electrically related injuries while employees are working near exposed energized parts which might be accidentally contacted or where dangerous electric heating or arcing might occur.

When normally enclosed live parts are exposed for maintenance or repair, they are to be guarded to protect unqualified persons from contact with the live parts.

Fuse handling equipment, insulated for the circuit voltage, shall be used to remove or install fuses when the fuse terminals are energized.

Ropes and hand lines used near exposed energized parts shall be nonconductive.

XXXIV. ALERTING TECHNIQUES

The following alerting techniques shall be used to warn and protect employees from electrical shock hazards, burns, or failure of electric equipment parts.

Safety Signs and Tags - Safety signs, safety symbols, or accident prevention tags shall be used where necessary to warn employees about electrical hazards that may endanger them.
Barricades – Barricades are used in conjunction with safety signs where necessary to prevent or limit employee access to work areas exposing employees to uninsulated energized conductors or circuit parts. Conductive barricades may not be used where they might cause an electrical contact hazard.
Attendants - If signs and barricades do not provide sufficient warning from electrical hazards, an attendant is to be stationed to warn and protect employees.

XXXV. FIRST AID AND CARDIOPULMONARY RESUSCITATION (CPR) REQUIREMENTS

Employees performing work on, or associated with, exposed lines or equipment energized at 50 volts or more shall be trained in first aid and CPR.

XXXVI. OTHER SAFETY HAZARDS

Employees performing work in and around campus buildings may be exposed to other hazards not covered by this program. These include, but are not limited to:

Fall Hazards - Employees that work in elevated locations where there is exposure to an unguarded fall hazard of 6 feet or greater must be provided and use fall protection equipment and must be trained to use this equipment properly. Employees that perform work exposed to fall hazards of 6 feet or greater must be trained to perform this work safely and must comply with the requirements of the Gallant *Fall Protection Program*.

Confined or Enclosed Spaces - A confined or enclosed space is a space that is large enough for an employee to enter and perform work, that has limited or restricted means for entry or exit, and that is not intended for continuous employee occupancy. Examples include, but are not limited to, sewers, silos, tanks, boilers, tunnels, vaults and manholes. Employees that perform work in confined or enclosed spaces must be trained to perform this work safely and must comply with the requirements of the Gallant *Confined Space Entry Program*.

Hazardous Materials - If you use or work around chemicals or other hazardous materials, you must be trained on how to read and interpret the Safety Data Sheet (SDS) for the material. You must also be informed of how to gain access to MSDS's, how to safely handle and store these materials, and you must comply with the requirements of the Gallant *Hazard Communication Program*.

Hot Work Operations - Abrasive grinding, welding, cutting and brazing, torch cutting and similar hot work operations are required to be permitted if performed outside of an approved hot work area. Permits and additional information may be obtained from the Safety Director.

Lockout / Tagout - Work conducted around other types of energized systems (for example, pneumatic, pressurized, spring-actuated and similar) must be addressed using approved lockout/tagout procedures and must comply with the Gallant *Lockout/Tagout Program*.

Asbestos and Lead Materials - Asbestos is commonly found in mechanical rooms and spaces, and may be present in pipe insulation, ceiling tile, plasters, flooring and electric wire insulation. Lead is commonly found in older paints and coatings. Both materials are potentially serious health hazards. It is a Gallant requirement, therefore, that all maintenance and renovation work that impacts building components, the Safety Director must review systems or equipment or authorized departmental representative before the work is performed to determine if asbestos or lead materials are present.

Work associated with electric power generation, transmission and distribution systems.
Training and additional information on the above Program may be obtained through the Safety Director.