GENERAL INFORMATION

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100.0 INTRODUCTION

100.1 GENERAL STATEMENT

The Colorado River Agency Electrial Services (CRA-ES) has on file in the Customer Service office its rates, regulations and extension policies, copies of which are open for inspection by the public at the CRA-ES business office.

The following are brief statements of those operating rules and practices which affect the majority of connections made to the CRA-ES lines. **Where information not included herein is needed, representatives of the CRA-ES will provide assistance.**

100.2 PURPOSE

In this manual, the CRA-ES presents information and general specifications relative to the introduction and use of electricity supplied from its lines. This manual is intended as a guide in making electrical installations to protect the interest of the Customer and to comply with regulations which experience has shown to be necessary for safe, adequate, and satisfactory service.

100.3 SCOPE

The information and specifications included herein cover conditions and equipment connecting Colorado River Agency Electrical Services electrical supply system to the Customer's premises. Subjects relative to this service are also presented for the mutual interest of the Customer and his representatives. **It is not a complete set of rules governing the installation of electrical wiring and equipment.**

100.4 SERVICE AND LIMITATIONS

Service will be rendered to the Customer from the CRA-ES nearest suitable line of sufficient capacity to furnish adequate service at the phase and voltage available. Service shall not be used by the Customer for purposes other than that specified in the applicable rate.
ELECTRICAL ENERGY PURCHASED FROM CRA-ES SHALL NOT BE RESOLD.

100.5 CODES

These requirements are supplementary to and are not intended to conflict with the currently applicable National Electric Safety Code, National Electric Code, Municipal, County or State Codes, Ordinances or regulations within the Code of Federal Regulations.

100.6 CUSTOMER SERVICES

CRA-ES Service Representatives will gladly provide you with useful information on the wise use of energy, electric heating, heat pumps, refrigeration, water heaters, residential and commercial lighting, security lighting, home economy, etc.

100.7 RATE SCHEDULES

Upon request of application, representatives of the CRA-ES will explain rate schedules and assist in selection of the rate best suited to applicant's requirements. Where more than one rate is applicable, applicant will be responsible for the final selection of the applicable rate schedules desired.

100.8 REQUESTS FOR INFORMATION

CRA-ES representatives will explain requirements and give advice with regard to the installation of electric service.

By calling CRA-ES before any installation is started, service plans may be coordinated, preventing costly changes and resulting in more rapid completion of the job.

100.9 INSPECTION APPROVAL AND PERMITS

On new installations, or where changes necessitate relocating or replacing CRA-ES meters, or when an installation has been disconnected by CRA-ES or the Fire Department because of fire or other damage, **CRA-ES shall not energize or restore service until the wiring has been approved and proper notification given to CRA-ES by the Colorado River Indian Tribes (CRIT) or appropriate inspection authorities where such inspection is required**.

In areas where local inspection is not required, the service entrance including grounding and bonding shall be in accordance with CRA-ES requirements and the National Electrical Code. The above equipment shall be inspected and approved by an CRA-ES representative prior to service being energized.

CRA-ES SHALL NOT BE UNDER ANY OBLIGATION TO INSPECT THE WIRING OR APPLIANCES OF THE CUSTOMER. WHERE CRA-ES HAS REASON TO BELIEVE THAT THE WIRING OR APPLIANCES ARE UNSAFE, AND DO NOT COMPLY WITH THE NATIONAL ELECTRICAL CODE, LOCAL OR COUNTY CODES OR ORDINANCES, CRA-ES MAY REFUSE OR DISCONTINUE ELECTRIC SERVICE UNLESS REQUIRED CHANGES HAVE BEEN MADE.

100.10 IDENTIFICATION OF JOB SITE

The customer shall furnish to CRA-ES an exact street number corresponding to the job location. In the case of mobile home or recreation vehicle subdivisions, the Mobile Home/ Parker subdivision, space or lot number must also be furnished. This street/space number shall also be posted in a conspicuous location at t assist CRA-ES personnel in performing their work as scheduled to meet the service date for the customer. The customer shall also install a permanent address number/space when the job is completed. To avoid delays in setting a meter and energizing a service, the address must agree with the address on the electrical permit and subsequent final clearance.

100.11 DESIGN OF CUSTOMER'S EQUIPMENT

The provision for adequate electrical capacity must be made by the customer. As a public utility, CRA-ES cannot design, plan, install or maintain the customer's wiring, electrical equipment or other customer owned facilities.CRA-ES (will not) be responsible after POD for Customers system design, system planing, installation or maintenance of the customer's wiring, electrical equipment or other customer owned facilities. Compliance with the National Electrical Code or local municipal or county codes assures only that the installation will conform to recognized minimum safe practices. An electrical engineer and/or a qualified electrical contractor should aid the customer in determining that his electrical installation will have adequate capacity for future use.

100.12 BEFORE YOU DIG

To comply with state law and OSHA, you must check with Blue Stake and other utilities who are not Blue Stake participants, but who may have underground facilities in your excavation area. You can save time, money and avoid hazards, prevent interruption of utility service and eliminate construction delays by getting underground utilities staked out in your excavation area prior to any digging. Prior to digging, contact your local coordinatior at http://www.azbluestake.com/ 602-659-7500, CRIT Water at 928-669-1296; Frontier Comm - 800-921-8101 and Southwest Gas - 877-860-6020. Please contact contact the services at least two (2) working days before you dig.

100.13 ATTACHMENTS ON CRA-ES POLES

CRA-ES forbids all unauthorized attachments, including posters, fences and signs, to its poles, equipment or property. CRA-ES will remove all such unauthorized attachments or installations without notice and may prosecute any such trespass.

100.14 IDENTIFICATION OF EMPLOYEES

CRA-ES employees authorized to visit a Customer's premises are furnished with an identification which they will show upon request. This is done to protect the Customer from unauthorized persons representing CRA-ES.

100.15 PROTECTION OF CRA-ES EQUIPMENT

It is understood that any of the CRA-ES equipment located on the Customer's premises shall be adequately protected against damage. The Customer is responsible for any damage or loss resulting from improper protection or loss resulting from improper protection or neglect.

100.16 DE-ENERGIZING THE SERVICE ENTRANCE

No person other than authorized employees of CRA-ES may break seals, move, relocate or replace meters and other equipment owned by CRA-ES. If de-energizing is needed, contact your local CRA-ES office to make arrangements.
In other than an emergency situation, three (3) days advance notice is required to de-energize a service. There may be a charge to accomplish the above.

100.17 ENERGY THEFT

Under no circumstances shall devices or attachments be connected to CRA-ES facilities in such manner as to permit the use of unmetered energy, except in emergencies when authorized and done only by authorized CRA-ES employees. Under 18 U.S.C. § 641 : US Code - Section 641 Shall be fined under this title or imprisoned not more than ten years, or both; but if the value of such property in the aggregate, combining amounts from all the counts for which the defendant is convicted in a single case, does not exceed the sum of $1,000, he shall be fined under this title or imprisoned not more than one year, or both.

100.18 WORKING SAFE NEAR CRA-ES FACILITIES

When a party plans to do construction or repair work where personnel or equipment will be used under or near CRA-ES electric transmission or distribution facilities, that party must obtain from CRA-ES a "Special Work Permit" designating the limits of the safe working area. CRA-ES facilities or equipment will not be disconnected or re-energized without the issuance of a Special Work Permit and clearance for third parties; nor if the net result of the construction causes CRA-ES to be in violation of any code.

WARNING

MINIMUM ELECTRICAL CLEARANCE

OSHA std. 1926.550(15) prohibits the use of equipment closer to high voltage lines than the distance listed below:

Required Clearances form Overhead High-voltage Lines

Voltage (Phase to Phase)	Minimum Required Clearance (Feet)
0 to 50,000	10
69,000	11
115,000	13
230,000	16
345,000	20
500,000	25

THE ABOVE CLEARANCES APPLY IN ANY DIRECTION, VERTICAL OR HORIZONTAL

CRA-ES PROCEDURE FOR DISCONNECTING AND RE-ENERGIZING POWER LINES

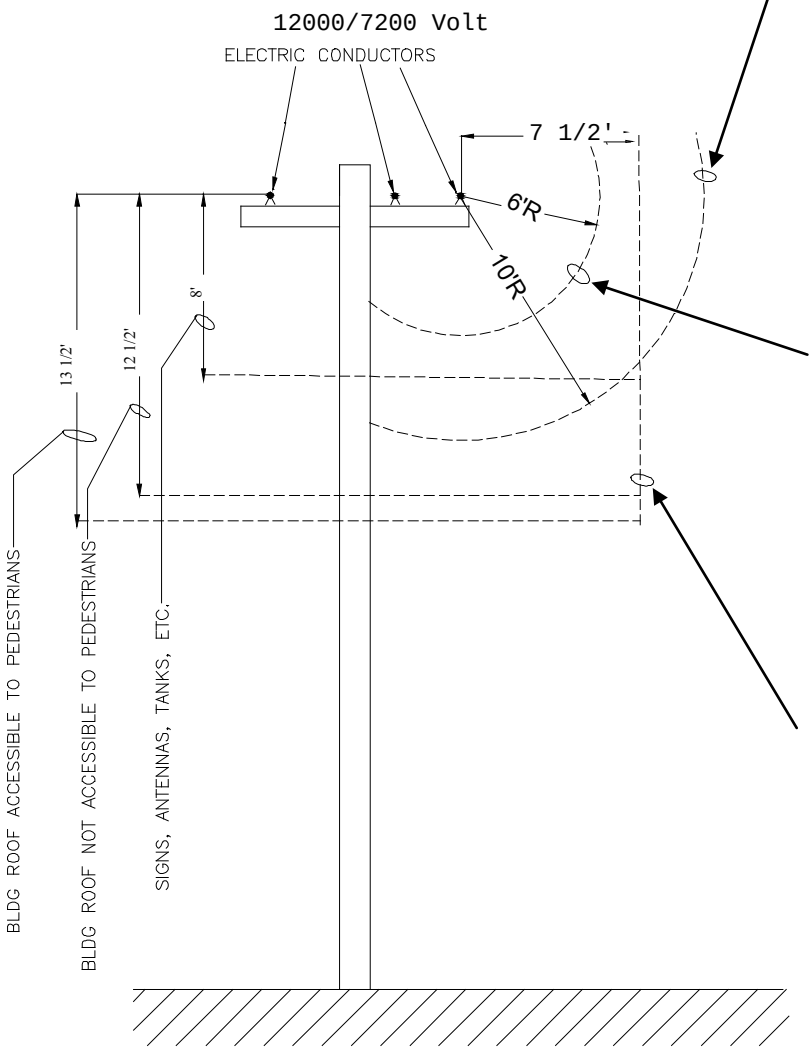
YOU, as the Requesting Party:

1. Contact CRA-ES *before* beginning work near CRA-ES facilities (lines, transformers, etc.) for de-energizing such facilities.
2. Arrange to have your authorized representative *meet an CRA-ES representative at the job site.*
3. Sign a Request for Special Work Permit at the job site.
4. After completion of work, for re-energizing those facilities, request a Release of Special Work Permit from CRA-ES.
5. Arrange to have your authorized representative *meet an CRA-ES representative at the job site.*
6. Sign a Release of Special Work Permit at the job site.

If you have a question, please contact your Local CRA-ES office @ 928-669-7119

CRAES Representative:

1. Receive the call requesting a Special Work Permit to de-energize CRA-ES facilities.
2. Assign a number to the request and arrange for a date and time for an on-site meeting with an authorized representative of requesting parties.
3. Prepare a Work Permit Form Also, obtain signature of requesting party, sign for CRA-ES, and distribute copies as listed.
4. De-energize the requested facilities, making sure the requesting party is aware of safe working area.
5. Receive the call from the requesting party after completion of the work, to re-energize CRA-ES facilities.
6. Arrange for an on-the-job site meeting with the requesting party's authorized representative.
7. Re-energize CRA-ES facilities that were de-energized under the Special Work Permit.
8. Prepare the Release of Work Permit Form , obtain signature of the requesting party, sign for CRA-ES, and distribute copies as listed.



OCCUPATIONAL SAFETY HEALTH ADMINISTRATION WORKING CLEARANCE REQUIREMENT FOR MACHINERY AND PEOPLE, AND ARIZONA STATUTE WORKING CLEARANCE REQUIREMENT FOR MACHINERY

NO MACHINE OR ANYTHING ATTACHED TO THE MACHINE, INCLUDING THE LOAD AND "TAG LINES", MAY BE BROUGHT WITHIN THIS RADIUS UNLESS LINE IS DE-ENERGIZED. A PERSON MAY NOT GET ANY PORTION OF HIS BODY OR ANYTHING HE'S HANDLING WITHIN THIS RADIUS. LINES RATED OVER 50 KV REQUIRE ADDITIONAL CLEARANCE.

ARIZONA STATUTE WORKING CLEARANCE REQUIREMENT FOR A PERSON:

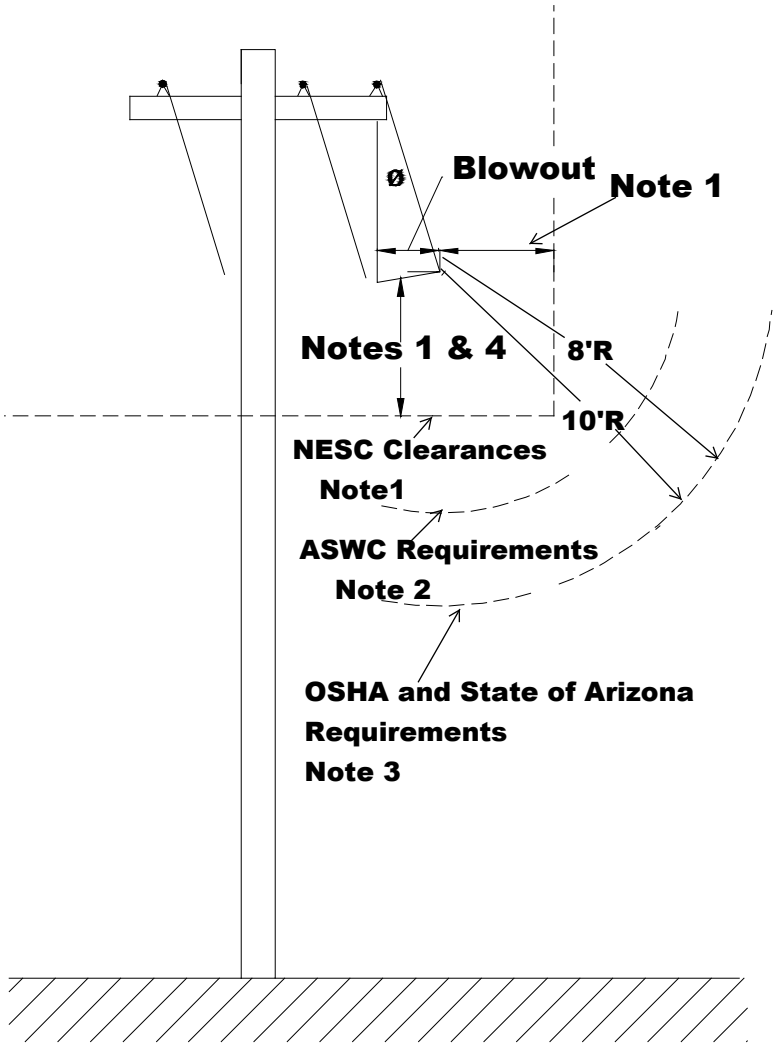
A PERSON MAY NOT GET ANY PORTION OF BODY, TOOLS OR MATERIAL HE'S HANDLING WITHIN THIS RADIUS UNLESS LINE IS DE-ENERGIZED. LINES RATED OVER 50 KV REQUIRE ADDITIONAL CLEARANCE. (THIS CLEARANCE IS ONLY APPLIED WHERE THE PERSON WORKING ISN'T SUBJECT TO OSHA REGULATONS.)

NATIONAL ELECTRIC SAFETY CODE MINIMUM CLEARANCE REQUIREMENT:

NO PORTION OF A BUILDING, SIGN, OR OTHER OBJECT MAY BE WITHIN THIS BOUNDARY. CLEARANCES SHOWN ARE ILLUSTRATIVE ONLY AND VARY WITH VOLTAGE LEVELS, WIND AND OTHER CONDITIONS. SEE SECTION 234 OF THE 2007 NESC.

NOTE: THIS DRAWING IS ONLY INTENDED TO SHOW THE RELATIONSHIP OF THE NATIONAL ELECTRIC SAFETY CODE, OSHA, AND ARIZONA STATUTE WORKING CLEARANCE REQUIREMENTS. REFER TO THE PROPER CODE OR REGULATION FOR A SPECIFIC INSTALLATION.

RELATIONSHIP OF NESC, OSHA, AND ARIZONA STATUTE CLEARANCE REQUIREMENTS AT THE STRUCTURE



RELATIONSHIP OF NESC, OSHA AND ARIZONA STATUTE CLEARANCE REQUIREMENTS AT THE SPAN

CONSTRUCTION NOTES:

1. NO PORTION OF A BUILDING MAY BE WITHIN THIS BOUNDARY.
2. FOR NON-CRAES PERSONNEL, ARIZONA STATUTE WORKING CLEARANCE (ASWC) REQUIRES THAT A PERSON MAY NOT GET ANY PORTION OF BODY,HANDS, TOOLS OR MATERIALS HE IS HANDLING WITHIN THIS RADIUS (LINES RATED 50KV AND BELOW), UNLESS POWERLINE IS FIRST DE-ENERGIZED. FOR LINES RATED OVER 50KV, CLEARANCE SHALL BE 72 INCHES PLUS 0.4 INCH FOR EACH KV OVER 50KV.
3. THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) AND ASWC REQUIRES THAT NON-CRAES MACHINERY MAY NOT OPERATE WITHIN THIS RADIUS (LINES RATES 50KV AND BELOW), UNLESS POWERLINE IS FIRST DE-ENERGIZED. "MACHINERY" INCLUDES THE LOAD, CABLES, TAG LINES AND ANY OTHER ATTACHMENTS. OSHA REQUIRES THAT A PERSON MAY NOT GET ANY PORTION OF HIS BODY OR ANYTHING HE'S HANDLING WITHIN THIS RADIUS. FOR LINES RATED OVER 50KV, CLEARANCE SHALL BE 10 FEET PLUS 0.4 INCH FOR EACH KV OVER 50KV.
4. BUILDINGS ARE NOT PERMITTED UNDER CRAES FACILITIES.

101.0 ABBREVIATIONS

AHJ — Authority Having Jurisdiction
ANSI — American National Standards Institute
CRA-ES — Colorado River Agency, Electrical Services Group
EUSERC — Electric Utility Service Equipment Requirements Committee
IAEI — International Association of Electrical Inspectors
IEEE — Institute of Electrical & Electronic Engineers
NEC — National Electrical Code (NFPA No. 70)
NECA — National Electrical Contractors Association
NEMA — National Electrical Manufacturers Association
NESC — National Electrical Safety Code
NFPA — National Fire Protection Association
OSHA — Occupational Safety and Health Act
U.L. — Underwriters Laboratories, Inc.

Note: When reference is made to any of the above codes, standards or regulations, it shall refer to the latest revision of same.

102.0 DEFINITIONS

FOR THE PURPOSE OF THIS MANUAL

102.1 AGENT

One who is authorized to act for another under a contract or relation of agency, either for CRA-ES or the Customer.

102.2 APPLICANT

The property owner, lessee, sub-lessee, their authorized agents and/or contractors applying for electric service from CRA-ES.

102.3 APPROVED

Acceptable to the authority having jurisdiction over the matter.

102.4 BASEMENT

As defined for the purposes of this manual is the floor(s) located below ground level.

102.5 BUILDING

A structure which stands alone or which is cut off from adjoining structures by fire walls with all openings therein protected by approved fire doors.

102.6 CLEARANCE

Approval of the electrical installation by the inspection authority.

102.7 DISTRIBUTED GENERATION

Any type of electrical generator or generating facility not owned or operated by CRA-ES that

(a) has the capability of being operated in electrical parallel with CRA-ES distribution system, or

(b) can feed a customer load that can also be fed by CRA-ES electrical system.

102.8 CRA-ES

Colorado River Agency, Electrical Services

102.9 CONTRACTOR

Any person, company, or corporation acting under contractual agreements for either the Customer or CRA-ES.

102.10 CURRENT TRANSFORMER METERING-DEFINED

When Customer loads are 201 amperes and above, current transformers are connected directly to the service entrance conductors to ratio the primary current down to a secondary current which can be accurately registered on the meter. (Example: A 400 to 5 amp. C. T. has a ratio of 80 to 1. The reading on the KW and KWHR scales is then multiplied by the ratio value of 80, indicated as X 80 on the face of the meter, to give the actual load in KW's or KWH's.

102.11 CUSTOMER

The property owner, lessee, sub-lessee, their authorized agents and/or contractors receiving electric service from CRA-ES.

102.12 FIRST FLOOR

As defined for the purposes of this manual is the floor that is closest to the elevation of ground level and above ground level.

102.13 HIGH RISE BUILDING

A building with four floors or more above ground level.

102.14 METER

The equipment required including mounting facilities, instrument transformers, protective devices and meters to measure the electric demand and/or consumption requirements of the Customer.

102.15 METER ROOM

Meter rooms are defined as illuminated and ventilated rooms containing electric meters and electric service equipment. See Section 300 for regulations and restrictions of meter rooms.

102.16 MULTIPLE METER CENTER

A multiple metering unit where two or more customers are metered at a common location.

102.17 NOMINAL VOLTAGE

Designation of the value of the normal effective difference in potential between any two appropriate conductors of the circuit.

102.18 POINT OF ATTACHMENT

The location at which restraining or anchoring contact is made on a building or structure to support CRA-ES wires.

102.19 POINT OF DELIVERY

That point where CRA-ES facilities are connected to those of the Customer.

102.20 READILY ACCESSIBLE

Capable of being reached quickly and conveniently during all reasonable hours of operation, maintenance, inspection, testing or reading, without requiring climbing over or removing obstacles, obtaining special permission, keys or security clearances. Indoor meter locations require access from the exterior of the building.

102.21 RECOGNIZED TESTING LABORATORY

An electrical component testing laboratory nationally recognized: Example: UL, ETL, etc.

102.22 SELF-CONTAINED METERS

A self-contained meter is one which is capable of carrying the total current and voltage of the electric service supplied to the customer. This type of meter is connected directly to the service entrance conductors when it is plugged into the meter sockets.

102.23 SELF-CONTAINED METER SOCKETS

Sockets for use with self-contained meters are available in two approved ratings. When connected to properly sized service entrance conductors, the approved standard-duty socket has a nominal capacity of 100 amperes, and the approved heavy-duty socket has a nominal capacity of 200 amperes. (See Section 300)

102.24 SERVICE ENTRANCE

Customer's service equipment together with CRA-ES metering equipment.

102.25 SERVICE ENTRANCE SECTION

A factory built floor standing service entrance.

102.26 SERVICE DROP

The overhead service conductors between CRA-ES secondary distribution system and the point of attachment to the building or other structure.

102.27 SERVICE ENTRANCE CONDUCTORS OVERHEAD SYSTEM

The conductors between the terminals of the service equipment and the point of connection with the service drop. (Installed by Customer.)

102.28 SERVICE ENTRANCE CONDUCTORS - UNDERGROUND SYSTEM

The conductors between the terminals of the service equipment and the point of connection to the service lateral or transformer. (Installed by CRA-ES.)

102.29 TEMPORARY SERVICE

A temporary service is intended to be used for 12 months or less only for non-recurring service of a transitory character. CRA-ES shall determine whether the Customer's proposed installation is of a temporary nature.

102.30 THIRD PARTY

Persons or Companies other than CRA-ES or its employee

102.31 VENTILATED

Provided with a means to permit circulation of air sufficient to remove an excess of heat. (N.E.C. Article 100)

102. 32 TOTALIZED METERING

Totalized Metering is the measurement of kw and kwh through one meter for billing purposes when multiple service entrance sections exist at a single premise.

103.0 ELECTRICAL TERMS

103.1 WATTS

Lamps and heating appliances are rated in watts to indicate the power which they will use. A 100 watt lamp in 10 hours will use 1000 watt-hours or 1 kilowatt hour (kwh) of energy. Likewise a 1000 watt flat iron in 2 hours will use 2000 watt-hours or 2 kilowatt hours (kwh) of energy.

103.2 KILOWATT (kw)

1000 watts

103.3 KILOWATT-HOUR (kwh)

A quantity of electrical energy - equal to 1000 watts used continuously for one hour, or 100 watts used continuously for ten hours, or equivalent.

103.4 HORSEPOWER (hp)

Motors are rated in horsepower, which is the mechanical output. Basically, 1 horsepower output requires approximately 1000 watts considering motor efficiency.

103.5 VOLTAGE (E)

Potential measured in volts.

103.6 CURRENT (I)

The rate of flow of electricity measured in amperes.

103.7 AMPACITY

Current-carrying capacity expressed in amperes.

104.0 SPECIAL CONSIDERATIONS

104.1 RESPONSIBILITY: USE OF SERVICE OR APPARATUS

CRA-ES and the customer assume all responsibility on their respective sides of the point of delivery for the electric service supplied and taken, as well as for any apparatus used in connection therewith.

Customer and CRA-ES each shall save the other harmless from and against all claims for injury or damage to persons or property occasioned by or in any way resulting from the electric service or the use thereof on their respective sides of the point of delivery. CRA-ES shall, however, have the right to suspend or terminate service in the event CRA-ES should learn of service use by Customer under hazardous conditions.

104.2 LINE DISTURBANCES

The operation of large flashing signs, welders, and furnaces, dielectric and induction heaters, reciprocating compressors and similar apparatus having intermittent flow of large currents sometimes interferes with other users of the electric service. The Customer shall consult CRA-ES in each case in order that the character of electric service that will be supplied, the corrective equipment needed, and other special precautions that must be taken, will be mutually known factors before planning to use such apparatus.

Radio and television transmitters, x-rays and similar equipment may be affected by normal disturbances on CRA-ES lines. The Customer should consult CRA-ES regarding proper type of service for this equipment.

104.3 MOTOR STARTING

The starting currents drawn from the source of supply by each rated size of alternating current motor (such values of currents to be determined by test or based on published data by the manufacturer) shall not exceed the allowable locked rotor current value for alternating current motors as given in the latest edition of the National Electric Code. Correction shall be allowed to adjust these current values so that they compensate for the difference between the terminal voltage and the rated voltage when applicable.

If the starting current of a motor exceeds the value given in the NEC, or creates undesirable service conditions, the Customer shall install, at his expense, a suitable reduced voltage or increment starting device to limit such starting current to the required values listed.

The values defined in the National Electrical Code apply only to motor types and nominal system voltages not exceeding those values quoted in these specifications. For types exceeding these quoted values and other information, consult with CRA-ES.

In some areas 208 and 240 volt motors larger than 25 HP and 480 volts motors larger than 75 HP shall be equipped with reduced voltage or increment starting devices to limit the starting currents. CHECK WITH CRA-ES.

The above-quoted specification may be modified to allow the use of across-the-line starting devices for larger motors by specific CRA-ES approval. Starters must conform to latest National Electric Manufacturer's Association Standards and installation must be in accordance with the National Electrical Code. Magnetic contactors in full voltage motor starters must have a coil capable of sealing in the contactor at 75% rated voltage.

104.4 SERVICE INTERRUPTIONS

Colorado River Agency Electrical Services cannot guarantee uninterrupted service, and it is not CRA-ES policy to pay for damages that result from such interruptions, single phase conditions, or voltage fluctuations on our system occasioned by any cause beyond the reasonable care and control of CRA-ES.

The CRA-ES distribution and transmission system is designed to minimize potential problems but, as pointed out above, malfunctions and other external forces do cause occasional system failures. In these instances, may we suggest that compliance with the National Electrical Code, sound electrical engineer and prudent use of properly sized, installed and maintained protective devices will protect your equipment.

For detailed information on how to protect your electrical equipment, contact an electrical contractor, equipment manufacturer, pump company, an electrical engineer or your local CRA-ES office.

104.5 POLYPHASE MOTOR PROTECTION

The following protective devices are required and/or strongly recommended by CRA-ES and shall be installed and maintained by the Customer:

1. Three element running overload protection shall be required on all motors; i.e., one overload element in each phase in the starter or equivalent protection devices. (per NEC)
2. All motor controllers shall be arranged so that in event of sustained loss in voltage, the motor will be disconnected from the line, unless it is equipped for automatic starting after such failure. Where continuous operation of motorized equipment is essential, motor controllers shall provide for motors to operate through a transient no voltage condition lasting for 1/2 second. Consult with CRA-ES where problems of this nature may be encountered.

The recommended devices listed below are strongly suggested to markedly reduce the possibility of damage to your polyphase equipment.

3. Low voltage protection is recommended on all polyphase motors.
4. Phase reversal protection is recommended in all polyphase motors for elevators, cranes and well-pump motors.
5. Phase failure protection is recommended on all polyphase motor circuits.

PLEASE NOTE: Some manufacturers supply a different device for each type of protection, while other may offer a single device that provides complete protection.

104.6 COMPUTER PROTECTION

Electronic computers are sensitive to momentary voltage fluctuations oftentimes referred to as “blips” or “spikes.” These may be created within the Customer’s service through motor starts or other electric load turn-ons. This may also occur external to the Customer’s service as a result of routine CRA-ES switching or fault clearance.

CRA-ES cannot assure a Customer that the electric service will be free of momentary voltage fluctuations. If this is a Customer concern, it is recommended that the Customer provide an interface between the electric service to the computer and the computer to screen out unwanted voltage fluctuations

104.7 SIGNAL DISTORTION

In general, the operation of any electrical device or system should not cause excessive distortion of the utility voltage waveform or result in excessive injection of harmonic currents into the utility system to the detriment of CRA-ES, its customers, or other electric utilities. **CRA-ES requires that all installations comply with IEEE 519 guidelines.** CRA-ES reserves the rights to test the equipment to ensure compliance to these guidelines. Even though equipment may be found to be in compliance with these guidelines, if it can be shown that said equipment is the source of problems for other customers, for CRA-ES, or for other utilities within the interconnected power system, CRA-ES reserves the right to require remedial action be taken by the owner.

104.8 AIR CONDITIONING - REMOTE (SPLIT) SYSTEMS

Blower motors *larger than 1/3 HP* in the furnace of the air handler shall not be connected to 120 volts. If the blower cannot be connected for 240 volt operation, either the compressor or blower shall be time delayed to prevent them from starting simultaneously.

104.9 CONTROL CIRCUITS

On three phase four wire Delta circuits, no control devices or single phase loads shall be connected to the power (wild) leg.

104.10 SPECIAL CASE TESTING

On installations where there is no county or municipal inspection authority, CRA-ES reserves the right to require that the customer's service entrance equipment be tested for insulation breakdown prior to it being energized. This test is to assure that the service entrance equipment is free of all shorts or grounds.

Service equipment rated at 400 amperes or more shall withstand for a period of one minute without breakdown, the application of a 60-hertz alternating potential of 1000 volts plus twice the rated phase-to-phase voltage of the device. This test shall be performed between all phases to ground and phase to phase.

A certified "hi-pot test" may be performed and a certificate issued to CRA-ES or a hi-pot test performed in the presence of qualified CRA-ES personnel.

104.11 CUSTOMER GENERATION

Customer generation, for the purpose of this section, is defined as any type of distributed generator or generating facility not owned or operated by CRA-ES, which has the potential (a) for feeding a customer load, where this load can also be fed by, or connected to, the CRA-ES power system, or (b) for electrically paralleling, or feeding power back into the CRA-ES power system.

The term "Customer", as used in this section, shall be construed to also include any independent party or entity that either invests in, or owns or operates a distributed generator or generating facility.

Customer generators include induction and synchronous electrical generators and any type of electrical inverter capable of producing A/C power. An Emergency or Standby Generation System is designed so as never to electrically interconnect or operate in electrical parallel with CRA-ES system. An Interconnected Generation System is defined as any generator or generation system that can parallel, or has the potential to be paralleled via design or normal operator control, either momentarily or on a continuous basis, with the CRA-ES system

104.11.1 EMERGENCY OR STANDBY GENERATORS

Emergency or Standby generators used to supply part or all of the Customer's load during an emergency power outage shall be connected to the Customer's wiring through a double throw, break before make transfer switch specifically designed and installed for that purpose. The transfer switch shall be of a fail-safe mechanical throw over design which will under no circumstances allow the generator to electrically interconnect or parallel with the CRA-ES system. The transfer switch shall always disconnect the Customer's critical load from the CRA-ES power system prior to connecting it to the generator. Conversely, the transfer switch shall also disconnect the load from the generator prior to reconnecting it back to the CRA-ES System. These requirements shall apply to both actual emergency operation as well as to testing the generator. All transfer switches and transfer schemes must be inspected and approved by the jurisdictional electrical agency.

Portable generators are not designed nor intended to be connected to a building's permanent wiring system, and shall not be connected to any such wiring unless a permanent and approved transfer switch is used. Failure to use a transfer switch can result in backfeed into the CRA-ES system - the generator voltage can backfeed through the CRA-EPS transformer and be stepped up to a very high voltage. This can pose a potentially fatal shock hazard to anyone working on the power lines.

104.11.2 INTERCONNECTED GENERATORS

Interconnected generators encompass any type of Customer generator or generating facility that can electrically parallel with, or potentially backfeed into the CRA-ES system. Additionally, any generator system using a "closed transition" type transfer switch or a multi breaker transfer scheme, or an electrical inverter that can be configured or programmed to operate in a "utility interactive mode" constitute a potential backfeed source to the CRA-ES system, and are classified as an interconnected generator.

CRA-ES has specific Interconnection Requirements that need to be complied with for all interconnected generators. These include a visible open disconnect switch meeting certain requirements to isolate the Customer's system from the CRA-ES system, as well as protective relaying, metering, special rate schedules, and other safety and information requirements. The Customer will also be responsible for having the generation system protective schemes tested by a qualified testing/calibration company. Qualified CRA-ES personnel will need to inspect the system and the Customer will need to sign an interconnect agreement with CRA-ES. Each proposal for an interconnected generator will be reviewed by CRA-ES on a case by case basis. CRA-ES does not extend "blanket approval" to any specific type of generator or generator scheme since each project review is site specific.

A line (supply) side tap constitutes a new service as defined by the National Electric Code (NEC), and is subject to all applicable NEC requirements and/or requirements adopted by the Authority Having Jurisdiction. Any line side tap shall be made without any modifications to any factory installed and/or factory listed equipment or components, unless such tap is expressly authorized by the manufacturer and/or listing agency, and performed in strict accordance with the manufacturer's directions and specifications.

Anyone contemplating installing an interconnected generator should contact their local CRA-ES office for further detail.

104.12 PROTECTION AND ISOLATION REQUIREMENTS FOR MULTIPLE UTILITY SERVICES TO A CUSTOMER FACILITY

In instances when CRA-ES serves a customer facility from two or more separate electrical sources (services), it is necessary to ensure that:

(a) The CRA-ES sources are not under any circumstances paralleled or in any way electrically connected together by the customer through the customer's equipment. Paralleling of CRA-ES sources by the customer can lead to the following conditions: fault current exceeding the fault duty rating of affected equipment; circulating currents in both the CRA-ES feeders and the customer's equipment due to voltage difference and/or phase imbalance between the sources; and reduced reliability of CRA-ES service in that a fault on one feeder will affect the other(s)

(b) Suitable isolation devices are incorporated into each of the customer's service entrance sections for the purpose of ensuring that each CRA-ES service, including the metering compartment, can be isolated from all other CRA-ES sources feeding the facility that can present a potential back-feed source to CRA-ES personnel.

104.12.1 To ensure that two or more CRA-ES sources are never paralleled or electrically connected together by the customer within the customer's facility, customer shall install suitable interlocks between the associated breakers in all customer facility breaker arrangements that constitute, or could constitute, a "Main-Tie-Main" or "Main-Tie-Tie-Main" type transfer scheme between the utility power sources. The interlock scheme(s) shall prevent the simultaneous closing of all of the breakers in any such breaker arrangement, and ensure that any load transfer between the utility power sources is always accomplished in an open-transition ("break-before-make") transfer mode.

In the event that manually-operated switches are used to effect a transfer between CRA-ES sources, and it is not physically possible to key- or otherwise interlock these switches, then the customer may, subject to prior CRA-ES approval, utilize written operating procedures along with suitable operational controls to effect a transfer of load between the sources. The customer will be responsible for establishing, maintaining and using written operating procedure(s) that govern the operation of all affected switches. The procedure(s) shall ensure that these switches will always be operated in such a manner to ensure an "open-transition" transfer between the utility power sources. In addition, such switches will remain locked by means of secure padlocks under customer's operational control. Suitable placards will be installed at each affected switch, identifying the switch and cautioning that it is only to be operated in strict accordance with established written operating procedure(s).

Note that the requirements specified in this section do not apply to a network service or other paralleling arrangement that is under CRA-ES' operating jurisdiction and that has been specifically designed and installed to allow for paralleling of CRA-ES sources.

104.12.2 To protect CRA-ES personnel from potential electrical back-feed when it is necessary to electrically isolate CRA-ES-owned equipment on any given service to a customer facility that is supplied by two or more utility sources, the customer shall install and maintain a suitable isolation device(s) on each of the service entrance section main buses. The isolation device shall meet all the requirements specified in Section 8.2 ("Disconnect Switch") of the CRA-ES document entitled "Interconnection Requirements for Distributed Generation" including grounding requirements and the establishment of an "Operating Agreement" for systems with a line voltage over 500 V.

A customer facility receiving utility service under 500 V, and utilizing only a double-throw transfer switch to effect the transfer of load between the utility sources and between any separately sourced circuits within the customer facility, is exempt from the requirements of this section, provided that the transfer switch: (a) is of a true double-throw, break-before-make, fail-safe mechanical throw-over design, which will not under any circumstances allow the utility sources to be paralleled; (b) is listed to UL1008; and (c) is not comprised of a multi-breaker scheme, irrespective of any interlocking scheme used between the breakers.

Note that for any CRA-ES service to a customer facility at a voltage above 500V, irrespective of the number of services to the facility, or the type of transfer scheme(s) used, the customer is required to provide a suitable isolation device in accordance with drawing numbers 401/CRA-ES-1 and 401/CRA-ES-2 specified in Section 1100 of this manual.

105.0 SPECIAL WORK REQUEST FOR THIRD PARTY

1. When a third party must perform work near overhead lines or equipment and the work cannot be performed outside of the minimum clearance distance one of the following must be done:
    a. De-energize line or equipment, establish a clearance, issue clearance form, & ground the line (when no system neutral is present the line shall be removed), and the Third Party Authorized Representative signs the proper form.
    b. Permanently relocate the existing line, or
    c. Temporarily re-route existing line to provide necessary minimum clearance distance.
2. If a thirdparty will be performing work near energized line (but not within the minimum clearance distance), it may be appropriate to install insulating barriers as additional precautionary methods taken and have the Third Party Authorized Representative sign.
3. If method 1 (a) or 1 (c) is used, this condition shall remain in effect until a Third party Authorized Representative notifies the company the work is completed and sign proper release form.