Welcome to Chapter 2. This study guide covers all nine sections of the Arborists in Proximity material. Let's again go over the call out boxes you'll see throughout this material. A CRITICAL call out is used for rules where failure to follow the rule can cause serious injury or death, and where the rule is highly likely to appear on the exam. Treat these as non-negotiable. An EXAM TIP call out is used to highlight specific exam strategies, common test traps, and information about how a concept is typically tested. A CROSS-REFERENCE call out is used to show how a concept connects to other rules within this chapter, or to the other two chapters of the curriculum, which are Line Clearing Operations and Electrical Utility Safety Rules. Many exam questions test these connections. And a NOTE call out is used for clarifying context, practical examples, terminology explanations, and background information that supports the rule but isn't a rule in itself.

Section I, Electrical Safety Compliance.

In Ontario, all arborists working in proximity to electrical apparatus must follow four sources of compliance, and the most stringent requirement always wins.

The Four Compliance Sources are: OHSA and Regulations, which is the Occupational Health and Safety Act and its regulations; Electrical Utility Safety Rules, or EUSR, as they apply to arborists; Local Utility and Controlling Authority Policies; and Employer Safe Work Practices and Procedures, for example the Davey Safety and Training Manual.

Critical: The Most-Stringent Rule. Whichever document holds the most stringent requirements for a given situation shall be considered the authority. When two sources disagree, you follow whichever one demands MORE safety, MORE PPE, or MORE clearance, never less. Exam tip: be ready to identify all four compliance documents and the most-stringent rule. Test questions often present a scenario where two sources conflict and ask which one governs.

Compliance Document Number 1 is the Occupational Health and Safety Act, or OHSA, and Regulations. This is the cornerstone legislation for workplace health and safety in Ontario. Its purpose is to: protect workers from health and safety hazards on the job; set out duties for all workplace parties and rights for workers; establish procedures for dealing with workplace hazards; and provide for enforcement when voluntary compliance fails.

Note: the Internal Responsibility System, or IRS, is fundamental to the successful working of the OHSA. It will be covered in detail in Section II.

Key Sections of the OHSA: General sections are 3, 4, 50, 51, and 52. Right to know sections are 37 and 38. Right to participate sections are 8, 9, and 10. Right to refuse unsafe work sections are 43, 44, 45, 46, 47, 48, and 49. Duties of employer sections are 25, 26, and 29. Duties of worker is Section 28. Duties of supervisor is Section 27. Duties of suppliers of equipment is Section 31. And penalties sections are 54, 55, 56, 57, 58, 62, and 66.

Exam tip: you don't need to memorize every section number, but know which OHSA section covers which duty. Section 25 and 26 equal employer duties. Section 27 equals supervisor

duties. Section 28 equals worker duties. Section 31 equals supplier duties. These come up repeatedly in Section II.

Compliance Document Number 2 covers Provincial Regulations. Provincial Regulations state specific requirements under the Act, and how to interpret the Act for the type of work being performed. Two regulations are relevant to arborist work.

Construction Regulations apply to construction work, which is defined broadly to include: erection, alteration, repair, dismantling, and demolition; structural maintenance and painting; land clearing, earth moving, grading, excavating, trenching, digging, boring, and drilling; blasting and concreting; installation of any machinery or plant; and any work or undertaking in connection with a project. This excludes any work or undertaking underground in a mine.

Note: line clearing operations performed in connection with a construction project, for example clearing for new infrastructure, fall under Construction Regulations.

Industrial Regulations apply to individuals and workplaces that provide a service in support of industry, typically the care and maintenance of an industrial establishment. An "industrial establishment" equals an office building, factory, arena, shop or office, and any land, buildings, and structures appertaining thereto. Note: routine line clearance maintenance on a utility's existing distribution system is generally treated under Industrial Regulations in Ontario, though the line between Industrial and Construction can depend on the project.

Key Section Topics Across Both Regulations: under Construction Regulations, Protective Clothing, Equipment, Devices are Sections 21 through 27; Housekeeping is Sections 35 through 48; Traffic Control is Sections 35 through 48; Chainsaw is Section 112; Elevating Work Platforms are Sections 143 through 149; Cranes are Section 150; and Electrical Hazards are Sections 181 through 195.3. Under Industrial Regulations, General sections are 4, 5, 6, 11, 22, 23, 24, 25, 26, 27, and 29; Chainsaw is Section 39; Electrical sections are 42.2, 43, 44, 44.1, and 44.2; Material Handling sections are 45, 46, 51, 52, 54, 55, 56, 57, 59, 60, 61, and 66; Ladders is Section 73; and PPE sections are 79, 80, 81, 82, 83, 84, 85, and 86.

Exam tip: the Electrical Hazards sections under Construction, which are Sections 181 through 195.3, include the well-known 3 m, or 10 ft., rule for any line over 750 V, which is the OHSA general minimum that appears throughout the curriculum.

Compliance Document Number 3 is the Electrical Utility Safety Rules, or EUSR. It governs conduct pertaining to electrical safety and working within proximity to electrical conductors. This is Chapter 3 of your curriculum and will be studied in depth later. For now, you need to know which EUSR rules apply specifically to arborist operations in proximity.

Critical: EUSR Rules Applicable to Arborist Operations in Proximity are: 100, 101, 102, 104, 107, 112, 113, 114, 117, 122, 123, 124, 128, 129, 130, 134, 135, 143, 145, and 147.

Exam tip: you don't have to memorize every number, but these are the EUSR rules you are most likely to be tested on. Pay particular attention to: Rule 107, which covers Job Planning;

Rule 117, which covers Hold-Offs; Rule 123, which covers Aerial Devices; Rule 129, which covers Safe Limits of Approach; Rule 130, which covers Items in Direct Contact with Energized Apparatus; Rule 134, which covers Tools and Equipment Testing; Rule 135, which covers Rubber Glove Work; and Rule 145, which covers Overhead Conductor Insulation.

Cross-reference: all of these EUSR rules will be studied in detail in Chapter 3. The Arborists in Proximity chapter shows you HOW to apply them; the EUSR Chapter 3 gives you the full text.

Compliance Document Number 4 covers Employer Safe Work Practices. Examples from the Davey Safety and Training Manual show that it: provides employees with current safety and operational procedures and information; exceeds OHSA regulations in many areas, because employer policies are often MORE stringent than the legal minimum; and is used in conjunction with OHSA, EUSR, and the employer's Career Development Program to achieve compliance.

Exam tip: remember the most-stringent rule. When the employer manual demands MORE than OHSA, the employer manual governs. When OHSA demands MORE than the employer manual, OHSA governs.

Applicable Manual Sections for Arborist Operations in Proximity include: Personal Protective Equipment; Job Site Safety; Electrical Hazards; Mobile Equipment; and Arborist Climbing and Rescue.

The Competent Worker is at the centre of compliance. The compliance system relies on the competent worker at the centre. A competent worker: knows which documents apply; knows how to determine which is most stringent for their situation; has the training, knowledge, and experience to apply the rules correctly; and recognizes when they need to escalate to a supervisor or controlling authority.

Cross-reference: the "Competent Person" definition matches what was established in LCO Chapter 1 Definitions: qualified by knowledge, training, and experience, familiar with the OHSA and Regulations, and with knowledge of any potential or actual danger to health and safety.

Section I key facts to memorize: the four compliance sources are OHSA plus Regulations; EUSR; Controlling Authority policies; and Employer safe work practices. The most-stringent rule means whichever document is most stringent for a given situation is the authority. OHSA section for employer duties is 25 and 26 and 29. OHSA section for supervisor duties is 27. OHSA section for worker duties is 28. OHSA section for supplier duties is 31. OHSA section for right to refuse unsafe work is 43 through 49. OHSA section for penalties is 54, 55, 56, 57, 58, 62, and 66. Construction Regulations electrical hazards are Sections 181 through 195.3. EUSR governs conduct pertaining to electrical safety and working in proximity. EUSR rules applicable to arborist proximity work are 20 rules: 100, 101, 102, 104, 107, 112, 113, 114, 117, 122, 123, 124, 128, 129, 130, 134, 135, 143, 145, and 147. EUSR Rule 107 covers Job Planning. EUSR Rule 117 covers Hold-Offs. EUSR Rule 129 covers Safe Limits of Approach. EUSR Rule 130 covers Items in Direct Contact with Energized Apparatus. EUSR Rule 135 covers Rubber Glove Work. EUSR Rule 145 covers Overhead Conductor Insulation. And employer manual applicable

sections are PPE, Job Site Safety, Electrical Hazards, Mobile Equipment, and Arborist Climbing and Rescue.

Section II, Rights and Responsibilities.

The OHSA assigns distinct duties to four workplace parties, gives every worker three basic rights, and protects those rights from retaliation. The whole system is held together by the Internal Responsibility System, or IRS, and the principle of due diligence. This section is the OHSA's view of "who is responsible for what," and almost every exam at every level draws questions from this material.

Critical: The Four Workplace Parties. Every OHSA duty in this section attaches to one of these four roles. You must be able to map each duty to its party. Number 1 is the Employer, covered by OHSA Sections 25 and 26. Number 2 is the Supervisor, covered by OHSA Section 27. Number 3 is the Worker, covered by OHSA Section 28. Number 4 is the Supplier, covered by OHSA Section 31.

The Four Parties and Their Duties.

1. Employer, OHSA Sections 25 and 26. The employer has the MOST responsibility for ensuring a safe and healthy workplace. An employer must: keep a safe and well-maintained workplace; provide hazard information, proper safety equipment, training, and competent supervision; have worker representation for health and safety, which is a Health and Safety Representative or Joint Health and Safety Committee; follow proper procedures in case of injury; and take every precaution reasonable in the circumstances for the protection of a worker.

Exam tip: "take every precaution reasonable in the circumstances" is the broad catch-all duty in Section 25(2)(h) of the OHSA, sometimes called the "general duty clause." This is what regulators and courts use to charge employers when no specific rule has been broken but a hazard was foreseeable and not addressed.

2. Supervisor, OHSA Section 27. A supervisor must provide: a safe workplace and assign safe work; ensure workers use and wear their equipment, protective gear, and so on as directed by the employer; take every precaution reasonable in the circumstances; training and information; and supervision.

Exam tip: note that the supervisor's duty to "take every precaution reasonable" mirrors the employer's. The difference is scope: the supervisor is accountable for the area or workers they supervise; the employer is accountable for the entire workplace.

3. Worker, OHSA Section 28. Workers have both positive duties, things they MUST do, and negative duties, things they must NOT do.

Workers MUST: work safely and not take risks; report unsafe conditions or defective equipment; use or wear any equipment, protective devices, or clothing required by the employer; and ask their employers and supervisors about concerns regarding health and safety.

Workers MUST NOT: remove or make ineffective any protective device required by the employer or regulations, except in specifically allowed circumstances; use or operate any equipment or work in a way that may endanger any worker; and engage in any prank, contest, feat of strength, unnecessary running, or rough and boisterous conduct.

Exam tip: the "no pranks, contests, feats of strength, running, or horseplay" rule is taken word-for-word from OHSA Section 28(2)(c). Expect a test question asking you to identify what's prohibited. This exact wording is a common quote.

4. Supplier, OHSA Section 31(1). A supplier must ensure: the machine, device, tool, or equipment is in good condition; the machine, device, tool, or equipment complies with the Act and Regulations; and if it is the supplier's responsibility under the rental, leasing, or similar arrangement, the equipment is maintained in good condition.

Note: "Supplier" includes anyone who sells, rents, leases, or otherwise supplies equipment for use in a workplace. For arborist work this commonly means rental companies for chippers, stump grinders, and aerial devices, as well as manufacturers and dealers.

Workers' Three Basic Rights.

Every worker in Ontario has three basic rights under the OHSA. The Right to Know is about workplace hazards and how to control them. The Right to Participate is in health and safety at work, through reporting and JHSC participation and so on. The Right to Refuse Unsafe Work is where the worker believes the work is unsafe OR where workplace violence is likely to endanger themselves.

Exam tip: the Right to Refuse is the most heavily tested of the three. Know that the right covers unsafe work AND likely workplace violence. The procedure for exercising the refusal involves immediate reporting to a supervisor, an investigation, and if unresolved, an MOL inspector being called. Refusal cannot be used in certain critical-service roles such as police, firefighters, and healthcare workers where the danger is inherent to the job, but this exception does NOT apply to arborists.

Reprisals by Employer Prohibited, OHSA Section 50(1). Critical: an employer is prohibited from threatening to fire or dismiss workers for: exercising their health and safety rights, OR asking their employer or supervisor to do what the OHSA requires.

Exam tip: the anti-reprisal protection covers BOTH exercising rights AND asking the employer to comply with the law. Threatening, suspending, demoting, disciplining, or imposing any penalty for these reasons is illegal.

Regulatory Agencies.

The agencies that enforce the OHSA, primarily the Ministry of Labour, Immigration, Training and Skills Development, formerly the MOL, have authority to: enforce the Act and its regulations; make orders and or requirements, for example stop-work orders and compliance orders; and lay charges and initiate prosecutions against you, whether you are the employer, supervisor, OR worker.

Note: charges can be laid against individuals, not just companies. A supervisor or worker can be personally charged and convicted under the OHSA. Penalties are listed in OHSA Sections 54, 55, 56, 57, 58, 62, and 66.

The Internal Responsibility System, or IRS.

The IRS is the underlying philosophy of occupational health and safety legislation in all Canadian jurisdictions.

What the IRS Is: an employee-employer partnership in ensuring a safe and disease-free workplace; everyone in the workplace, both employees and employers, is responsible for their own safety AND for the safety of co-workers; and acts and regulations do not always impose or prescribe the specific steps to take for compliance, because the IRS holds employers responsible for determining those steps.

What the IRS Does: it establishes responsibility-sharing systems; promotes safety culture; promotes best practice; helps develop self-reliance; and ensures compliance.

The IRS Trade-Off: the IRS gives employers the "freedom" to carry out measures and control procedures appropriate to their individual workplaces. The trade-off for that freedom is that the employer must know when they have fulfilled all appropriate regulatory requirements, and that's where due diligence comes in.

Exam tip: the IRS is uniquely Canadian. It's the philosophical foundation of every provincial OHSA in Canada. Be ready to identify it as such, and to identify shared responsibility, meaning employer plus worker plus supervisor plus supplier all responsible together, as its key feature.

Due Diligence.

Critical: due diligence equals the level of judgement, care, prudence, determination, and activity that a person would reasonably be expected to do under particular circumstances.

How an Employer Exercises Due Diligence: to exercise due diligence, an employer must implement a plan to identify possible workplace hazards, and carry out the appropriate corrective action to prevent accidents or injuries arising from these hazards.

The Critical Timing Rule: critical: due diligence is demonstrated by your actions BEFORE an event occurs, NOT AFTER. After an incident, no amount of investigation, paperwork, or "we'll do better next time" can substitute for due diligence that should have been in place before the incident.

Exam tip: the "before vs. after" timing rule is a likely exam question. Due diligence is proactive, not reactive. If an employer is charged after an incident, their defence rests on what they did beforehand, including the training, hazard assessments, procedures, supervision, and corrective actions that were already in place.

How the Pieces Fit Together: the four parties' duties define WHO is responsible for WHAT. Workers' three rights define what every worker is ENTITLED to. Anti-reprisal under Section 50 protects workers from retaliation when they exercise their rights. Regulatory agencies enforce duties and rights via inspections, orders, and prosecutions. The IRS is the shared-responsibility philosophy that ties it all together. And due diligence is the standard by which an employer's actions are judged, proactively.

Section II key facts to memorize: number of workplace parties under OHSA is 4, being Employer, Supervisor, Worker, and Supplier. Employer duties are OHSA sections 25 and 26. Supervisor duties are OHSA section 27. Worker duties are OHSA section 28. Supplier duties are OHSA section 31(1). Anti-reprisal is OHSA section 50(1). Worker's three basic rights are Right to Know, Right to Participate, and Right to Refuse Unsafe Work. Right to Refuse OHSA sections are 43, 44, 45, 46, 47, 48, and 49. Right to Know OHSA sections are 37 and 38. Right to Participate OHSA sections are 8, 9, and 10. Who has the most responsibility is the employer. "Take every precaution reasonable" applies to Employer AND Supervisor. Worker prohibited conduct includes removing protective devices; using equipment in endangering ways; and pranks, contests, feats of strength, running, or horseplay. IRS stands for Internal Responsibility System. IRS scope is all Canadian jurisdictions. IRS core idea is that everyone, both worker and employer, is responsible for their own safety AND co-workers' safety. Due diligence definition is judgement, care, prudence, determination, and activity a person would reasonably exercise. Due diligence timing is demonstrated BEFORE an event, not AFTER. Regulatory agencies' three powers are to enforce; make orders and requirements; and lay charges and initiate prosecutions. Penalty sections are OHSA 54, 55, 56, 57, 58, 62, and 66.

Section III, Electrical Theory.

Section III is in two parts. Part 1 covers the measurement of electricity, which includes the four units every utility arborist must know. Part 2 covers the components of the power distribution system, including the equipment you'll encounter in the field from generation to the customer's meter. The vocabulary is heavily tested. The component knowledge is essential for hazard recognition, because you cannot apply Limits of Approach if you can't identify what the equipment in front of you is.

Cross-reference: much of this material overlaps with LCO Section II, Basic Electricity for Foresters. The water-system analogy, where voltage equals pressure, current equals flow, and resistance equals restriction, introduced in LCO is the same model used here.

Part 1, Measurement of Electricity.

The Four Units: Volt (V), or voltage, measures electrical PRESSURE, which is the "push" that moves current through a circuit. Ampere (A), or amps or amperage, measures FLOW RATE of electrical current, like measuring water flow rate through a pipe, for example gallons per hour. Ohm, represented by the Greek symbol Omega, measures RESISTANCE to flow of electricity, which is the opposition a material offers to current flow. And Watt (W), or wattage, measures electrical POWER, which is the power developed by a current of 1 ampere flowing at 1 volt.

Exam tip: the exam often tests by giving you a definition and asking which unit it describes. Volt equals pressure. Ampere equals flow. Ohm equals resistance. Watt equals power.

Conductors and Resistance: material through which electricity easily flows is a good conductor, meaning it has low resistance. Note: reference scale: No. 10 copper wire, which is about 1/10 inch in diameter, has a resistance of only 1 ohm per 1,000 feet. This is exceptionally low, making copper one of the best practical conductors available.

Cross-reference: the three material categories from LCO Rule 202 apply here. Insulators, such as glass, porcelain, and rubber, have high resistance and almost no current. Conductors, such as metals and the human body, have low resistance and current flows freely. Semiconductors, such as wood, rope, and earth, have variable resistance depending on moisture.

Critical: wood and the human body are both conductors of electricity, and Rule 800 in LCO requires you to treat all wood as a conductor at all times, regardless of whether it is dry, green, or wet.

Part 2, The Electrical Power Generation System.

Power Generation Sources: electricity is generated from six common sources: coal, hydro, natural gas, diesel, nuclear, and steam.

The Path from Generation to Customer follows this sequence: Generation, where the power plant produces electricity; Transmission, which is bulk transport at very high voltage; Substation, which handles switching and voltage transformation; Distribution which is Primary, covering local distribution lines; Voltage Regulation, which maintains stable voltage; Protective Equipment, including fuses, reclosers, and switches; Transformer, which steps voltage down to customer level; and Your Home, where secondary lines deliver service voltage.

Exam tip: be able to put these stages in the correct order. A common question format presents the stages out of order and asks you to identify the correct sequence.

Part 3, Components of the Power Distribution System.

Transmission Lines. Critical: transmission lines equal the bulk transport of high-voltage power, typically over longer distances, between generating plants and distribution systems. Normally energized above 100,000 volts, or 100 kV.

Exam tip: the 100 kV threshold is the dividing line between transmission and distribution. Anything above 100 kV is transmission; anything below is generally distribution. Memorize this number.

Substation. Critical: a substation equals an assemblage of equipment for the purposes of switching and or changing or regulating the voltage of electricity. Substations are the transition points between transmission and distribution systems. They contain transformers, switches, reclosers, and protective equipment.

Primary Lines. Critical: primary lines equal a wire or combination of wires not insulated from one another, suitable for carrying electric current. Primary equals the energized electric line between a substation, or point of supply, and the distribution transformers. A primary line can be above ground OR below ground. And it is normally energized between 1,000 V and 36,000 V.

Critical: primary voltage range is 1,000 V to 36,000 V. This is the voltage range an arborist most commonly encounters in line clearing work.

Neutral. Critical: neutral equals a de-energized electric line that normally runs along with the overhead primary distribution.

Critical: despite being called "de-energized," the neutral is part of the return path for the circuit. Do not treat the neutral as electrically safe. It can carry current and can become energized under fault conditions.

Transformers: a transformer changes voltage, either stepping it down for customer use, or stepping it up to extend a circuit's reach. Five types of transformers an arborist will encounter are: an Overhead Transformer, which reduces the voltage of the primary circuit to the voltage required by a customer and is pole-mounted; a Pad-Mounted Transformer, which is a ground-level enclosure energized from electrical conductors run underground; a Transcloser, which consists of overhead transformers sitting on a concrete pad inside a cabinet; a Step Transformer, which changes the voltage of the primary circuit, usually to extend the length of a circuit by stepping voltage up; and a Voltage Regulator, which provides a constant voltage despite variations in input voltage or output load.

Exam tip: be able to distinguish the transformer types by location, whether overhead or ground-mounted, and by purpose, whether step-down for customer use or step-up to extend reach. A common test question is: "What is the purpose of a step transformer?" The answer is: to extend the length of a circuit.

Secondary Lines. Critical: secondary lines equal the conductors originating at the low-voltage secondary winding of a distribution transformer. A secondary can be above or below ground.

Secondary lines deliver service voltage, typically 120/240 V, from a transformer to a customer. Common configurations are: Quadraplex, which is 4 Wire Open; Triplex, which is 3 Wire Open; and Duplex, which is 2 Wire Open.

Note: "Open" means the conductors are not encased in conduit or sheathed cable. They're individually supported in air with insulation.

Pole Hardware.

Three components work together to keep an overhead line standing. The Pole elevates the electric line above ground. The Guy keeps the pole from pulling out of the ground, which is a wire under tension. And the Anchor attaches the guy to the ground.

Critical: a guy wire is made of metal and connected to the pole. If the pole or any equipment on it becomes energized due to a fault, the guy wire can become energized too.

Cross-reference: this will be relevant in Section IX when we cover EUSR Rule 130, which covers items in direct contact with energized apparatus. A guy wire is one of the items that may become a conductor of electricity in a fault.

Underground Distribution Components.

Pedestal and Vault. Critical: a pedestal or vault equals an underground device placed in the distribution system to allow for spliced access to conductors. Can be above grade, at grade, or below grade.

Note: "at grade" or below-grade pedestals are easy to walk over without noticing. Be aware of their location on the work site.

Customer-End Components.

Meter. Critical: a meter equals a device that measures the amount of electricity a customer uses.

Light. Critical: a light equals a device used to illuminate an area. Four common types are: Decorative, Street, Flood, and Yard.

Protective Equipment.

Three types of equipment protect the system from faults.

Lightning Arrestor. Critical: a device for protecting electrical equipment from damage from lightning strikes.

Recloser. Critical: a device for protecting electrical equipment from line faults. Usually can act multiple times. It will automatically attempt to re-close the circuit after a fault clears.

Critical: reclosers are the reason hold-offs exist. When a tree or limb causes a fault, the recloser will automatically try to re-energize the line 1 to 3 times. Without a hold-off in place, a worker thinking the line is dead may be struck by re-energization.

Fuse. Critical: a device for protecting electrical equipment from line faults. Usually acts only one time. It burns out and must be manually replaced.

Exam tip: know the difference between a recloser and a fuse. Recloser equals automatic, multiple actions, and resets itself. Fuse equals one-time, burns out, and must be manually replaced.

Switches and Control Equipment.

Switch. Critical: a device intended for use in general distribution and branch circuits. A switch is primarily used to direct electric flow, can be opened AND closed, and is capable of interrupting its rated voltage.

A junction box or cabinet is an enclosure that may contain switches and other control equipment.

Voltage Regulator. Critical: a device which provides a constant voltage despite variations in input voltage or output load.

Open Point, Two-Way Feed, and Double Dead End. Critical: Open Point equals a location in an electrical system where the electricity does NOT feed through. Two-Way Feed and Double Dead End equal a location in an electric system where electricity is coming from multiple directions.

Critical: a two-way feed means isolating one end of a circuit is not enough. If a line is fed from two directions, both ends must be opened to de-energize the line. This is a major reason why isolation must always be confirmed by the controlling authority, never assumed by an arborist.

Riser. Critical: Primary Riser equals the takeoff location at the top of a primary pole where the jumper is connected from the overhead primary to the primary in conduit. Secondary Riser equals the takeoff location on a pole where the jumper is connected from the secondary or overhead transformer to the secondary in conduit.

Primary Riser Characteristics: normally associated with overhead protective equipment such as fuses or switches; can be one, two, or three phases; and underground primary terminates at a pad-mounted transformer or switching cabinet.

Secondary Riser Characteristics: can be two, three, or four conductor.

Exam tip: a "riser" is where an overhead line transitions to an underground line, or vice versa, by running down a pole inside conduit. Recognize this configuration in the field. The wire going down inside a vertical conduit on a pole is a riser.

Joint Use Attachment. Critical: communication lines, including cable television and telephone, are attached to the same pole as the electrical distribution.

Critical: joint use attachments are at lower height than the electrical conductors, but they are NOT a safe touch point. Always treat the entire pole assembly with the same caution as the highest-voltage conductor on it.

Hendrix Cable, Covered Conductors. A Hendrix cable system allows the phase conductors to be supported by the messenger wire and exposed to virtually no tension. This reduces service interruptions due to wind and falling debris.

Critical: Hendrix Covered Conductors are NOT touch-safe. Despite popular belief, Hendrix covered conductors are NOT screened and NOT touch-safe when energized. Arborists must apply the same Limits of Approach to coated conductors as to non-coated conductors.

Cross-reference: this matches EUSR Rule 145, Overhead Conductor Insulation, and LCO Rule 800 number 10: covered or weatherproof coatings are NOT insulation. Treat all covered conductors as bare and alive unless positively known to be isolated and de-energized.

Exam tip: Hendrix cables look insulated but they are not. This is a classic exam trap. The covering is weather protection, not electrical insulation.

The "Covering Is Not Insulation" Principle. This principle is the most important conceptual takeaway from Section III, and it's stated three times across the curriculum. Arborists in Proximity states: "Hendrix covered conductors are not screened and are not touch safe when energized." LCO Rule 800 number 10 states: "Weatherproof covering on conductors is not considered insulation. Consider covered conductors bare and alive unless positively known to be isolated and de-energized." And EUSR Rule 145 states: "All covered, jacketed, or insulated overhead conductors energized at voltages greater than 750 V shall be treated as bare conductors."

Critical: if you remember nothing else from Section III, remember this. The covering on conductors is NOT insulation. It is weatherproofing to protect the wires. Only a circuit map of the system will accurately and reliably tell you the voltage of a line in question, and only under normal conditions.

Section III key facts to memorize: Volt measures electrical pressure. Ampere measures flow rate of electrical current. Ohm measures resistance to flow of electricity. Watt measures electrical power, being 1 amp times 1 volt. No. 10 copper wire resistance is 1 ohm per 1,000 ft. Transmission line voltage is normally above 100,000 V, or 100 kV. Primary line voltage range is 1,000 V to 36,000 V. Secondary line voltage is typically 120/240 V. Six power generation sources are coal, hydro, natural gas, diesel, nuclear, and steam. Path of electricity stages are Generation, then Transmission, then Substation, then Distribution, then Voltage Regulation, then Protective Equipment, then Transformer, then Customer. Substation purpose is switching and or changing or regulating voltage. Neutral is a de-energized line running with overhead primary, but it is NOT safe because it is a return path. Five transformer types are overhead, pad-mounted, transcloser, step, and voltage regulator. Step transformer purpose is to extend the length of a circuit. Voltage regulator purpose is to provide constant voltage despite

variations. Secondary configurations are Quadraplex which is 4-wire, Triplex which is 3-wire, and Duplex which is 2-wire. Pole hardware consists of Pole plus Guy plus Anchor. Recloser is automatic and multiple actions. Fuse is one-time and must be manually replaced. Lightning arrestor protects from lightning strikes. Switch directs electric flow, can open and close, and interrupts rated voltage. Open point means electricity does NOT feed through. Two-way feed or double dead end means electricity comes from multiple directions. Primary riser phases are one, two, or three. Secondary riser conductors are two, three, or four. Joint use attachment is cable TV and telephone on same pole. Hendrix cable covering is NOT touch-safe and NOT insulation. Only reliable voltage source is a circuit map under normal conditions. Covered conductors must be treated as bare and alive.

Section IV, Dangers of Electrical Shock.

Section IV explains how electricity injures and kills people. Understanding the mechanics is essential because every safety rule that follows, including Limits of Approach, PPE requirements, hold-offs, and DIG, which stands for De-energize, Isolate, Ground, exists to interrupt one of the conditions described here. This section is technical and conceptual. The three factors that determine shock severity, the four principles of electricity, and the two contact pathways are all heavily testable.

The Three Factors That Determine Damage from Electrical Shock. Critical: damage from electrical shock is determined by three factors. Number 1 is the amount of current. Number 2 is the duration of current. Number 3 is the path of current through the body.

The amount of voltage matters only insofar as it determines how much current flows for a given resistance, but it's the current in amperes flowing through the body, not the voltage, that does the damage.

Cross-reference: this builds on LCO Rule 202: as little as 0.1 A, or one-tenth of an ampere, can stop a human heart. Voltage drives current; current does the damage.

Exam tip: be ready to identify the three factors that determine shock damage. A common test format presents four options and asks which one is NOT a factor. Voltage is sometimes the distractor, because it's a contributing factor but not one of the three direct determinants of damage.

The Four Main Principles of Electricity. These four principles together explain why and how electrocution happens. Critical: The Four Principles. Number 1: electricity must have an uninterrupted path or circuit to follow. Number 2: electric current, the movement of electricity, can only happen when a circuit is completed. Number 3: electricity will only flow when there is a path to the ground. Number 4: electricity always follows the path of least resistance.

Critical: how electrocution happens. Electrocution occurs when the human becomes the path of least resistance for electricity to get to ground.

Exam tip: memorize the four principles in order. The fourth principle, the path of least resistance, is the key to understanding why every safety procedure works the way it does. PPE, rubber gloves, insulated tools, fall protection, and Limits of Approach are all designed to ensure the human is NOT the easiest path to ground.

Completing the Circuit, Two Ways to Become the Path.

There are two scenarios in which a worker becomes the path to ground.

Scenario 1: Between a Conductor and a Neutral or Ground Wire. The worker bridges between the energized conductor and a deliberately grounded wire, which is the most direct and dangerous path.

Scenario 2: Between a Conductor and Some Other Path to Ground. The worker bridges between the energized conductor and a conductive object that itself leads to ground. Common examples include: a tree, tree branch, or vine; a utility pole; a guy wire; and an aerial device in which the insulation has been reduced.

Critical: trees are excellent conductors of electricity. A worker in a tree that is touching an energized conductor has already completed half the circuit. The worker only needs to add the second contact point to become the path to ground.

Cross-reference: this matches LCO Rule 103-K number 4: "Under no circumstances should employees climb between energized conductors." And LCO Rule 800 number 1: wood must always be treated as a conductor.

Direct vs. Indirect Contact. There are two types of electrical contact. Direct contact means the employee is the source to ground and touches the energized conductor directly. Indirect contact means the employee contacts a source to ground and touches a conductive object such as a tree, tool, pole, and so on, that is itself contacting an energized conductor.

Cross-reference: these are the same two categories defined in LCO Rule 203. Indirect contact is the more common hazard in line clearing because the worker rarely touches the wire itself, but often touches something that is touching the wire.

Exam tip: be ready to identify a scenario as direct or indirect contact. A worker who grabs a fallen energized wire is making direct contact. A worker who prunes a branch in contact with a live conductor is making indirect contact.

Step Potential. Critical: step potential is the difference in voltage between two points that are one step apart.

How Step Potential Kills: when a live wire touches the ground, voltage decreases as electricity travels outward from the point of contact, which is the "ground gradient" introduced in LCO Section II. If a worker walks through this gradient, their feet land in two different voltage zones at

the same time. Current flows into one leg at the higher voltage zone, out the other leg at the lower voltage zone, and through the lower torso, meaning the legs, hips, and pelvis.

Critical: How to Move in a Step Potential Zone. The risk increases if you run or take large steps, because larger steps put your feet farther apart and into zones of greater voltage difference. If you must move, use small shuffling steps, meaning feet together or one foot sliding past the other without separating, to minimize the voltage difference between your feet.

Cross-reference: step potential is covered in LCO Rule 204 with the same description, including ground gradient, voltage drop, and feet in different potential zones. LCO Rule 204 also gives the procedure for what to do: stay away from the broken conductor, keep others away, and contact the utility immediately.

Touch Potential. Critical: touch potential is the difference in voltage between your hands and feet when you touch something energized while standing on the ground.

The Mechanics: touch potential equals the voltage between an energized object and the feet of a person in contact with the object. It equals the difference in voltage between the object and a point some distance away.

Critical: Touch Potential Worst-Case. Touch potential could be nearly the full voltage across the grounded object, especially if that object is grounded at a point remote from where the person is in contact with it. In other words: the farther away the object's actual ground point is from where you touch it, the higher the voltage you may be exposed to.

The Current Path: current flows hand-to-foot through the upper torso. The path passes through the heart and lungs. This is the most dangerous current path because it directly affects life-critical organs.

Exam tip: be able to distinguish step potential from touch potential. Step potential equals foot-to-foot, through the lower torso, due to a gradient on the ground. Touch potential equals hand-to-foot, through the upper torso and heart, due to touching an energized object. The body's current path differs, and so does the cause. This is a classic test question.

Electrical Arcing. Critical: electricity will follow conductive objects that contact an electrical source and then move away, resulting in an arc.

How Arcs Behave: under normal conditions, electricity arcs less than one-fourth the length of the insulator that the conductor is attached to. Voltage and atmospheric conditions determine how far an arc can be drawn from a conductor.

Critical: higher voltage equals longer possible arc. Wet, humid, or dusty atmospheric conditions equal longer possible arc. This is why Limits of Approach increase with voltage and why work is suspended during electrical storms.

Note: why arcs matter for arborists. You do not need to touch an energized conductor to be electrocuted. The conductor can arc to you, your tools, a branch, or your aerial device if you come too close. Limits of Approach include arc-prevention margins, and that's part of why they exist.

Cross-reference: this is the physical reason behind EUSR Rule 129, which covers Safe Limits of Approach, because the clearances are designed to prevent arcing. It also explains LCO Rule 103-D, which covers work suspension during electrical storms, because atmospheric ionization makes arcing easier. And it explains EUSR Rule 145, which explains why covered conductors are still treated as bare, because the cover does not block arcing.

Backfeed. Critical: backfeed equals when electricity travels in the reverse direction from its normal flow.

The Classic Backfeed Scenario: a homeowner has an incorrectly installed generator during a power outage. The generator injects power into the home's electrical system, but the transfer switch is missing or defective, so the generator's output flows OUT of the home and BACK into the local power grid.

Why Backfeed Is Catastrophic. Critical: Transformers Step Up AND Down. Because transformers have the ability to step current up as well as down, once the current from a small household generator reaches a transformer, it can power the local utility grid to full primary voltage.

This means a "dead" line, that an arborist might be working on after the utility de-energized it, can be silently re-energized to primary voltage of 1,000 V to 36,000 V by a homeowner's small generator several houses away.

Exam tip: backfeed is a key reason why "de-energized" is not the same as "safe." The line may have been opened upstream, but a backfeed source such as a generator, solar inverter, or battery system downstream can re-energize it. This is why the full DIG procedure, which is De-energize, Isolate, Ground, is required. Grounding the line shorts out any backfeed attempt.

Cross-reference: backfeed is the reason for several rules covered later in this chapter, including the need for proper isolation rather than just opening one end of a circuit; the need for grounding as part of DIG; and the rule "If it's not grounded, it's not dead!"

When Does an Electrical Hazard Exist? Critical: Davey Safety and Training Manual definition. An electrical hazard exists when a worker, tool, or any conductive object is closer than, OR has the potential to approach closer than, the Limits of Approach to an energized conductor, which is the OHSA Minimum.

This definition has two important parts: "actually closer," meaning you're already in the danger zone; and "potential to approach closer," meaning your planned work would bring you, or your tool, or material, or vegetation inside the limit.

Exam tip: the hazard exists BEFORE you cross the line. As soon as your planned work means you COULD cross it, the hazard exists and all proximity rules apply.

Mandatory Pre-Work Inspection. Critical: an inspection shall be made by a qualified tree worker to determine whether an electrical hazard exists before climbing, otherwise entering, or performing any work in a tree.

Cross-reference: LCO Rule 500, Tree Inspection, covers the 5-point inspection for every job and the 4-point removals inspection. LCO Rule 103-C number 2 states that trees must be closely inspected before climbing. And LCO Rule 700 states to visibly inspect the path of ascent before climbing.

Section IV key facts to memorize: the three factors determining shock damage are amount of current, duration of current, and path of current. Lethal current threshold is 0.1 A, or 1/10 amp, which can stop a human heart. Four principles of electricity are: (1), uninterrupted path required; (2), current equals completed circuit; (3), must have path to ground; (4), follows path of least resistance. Cause of electrocution is the human becoming the path of least resistance to ground. Two ways to become path to ground are (1) between conductor and neutral or ground wire, and (2) between conductor and another path to ground such as a tree, pole, guy wire, or compromised aerial device. Two types of contact are direct, meaning the employee is source to ground, and indirect, meaning the employee contacts a source to ground. Step potential definition is the difference in voltage between two points one step apart. Step potential current path is foot to foot through lower torso. Movement in step potential zone requires small shuffling steps, and never run or take large steps. Touch potential definition is the difference in voltage between hands and feet when touching something energized while standing on ground. Touch potential current path is hand to foot through upper torso, near the heart and lungs. Touch potential worst-case is nearly full voltage if grounded remotely from contact point. Arc distance under normal conditions is less than 1/4 the length of the insulator. Factors increasing arc distance are higher voltage and atmospheric conditions such as humidity, dust, and ionization. Backfeed definition is electricity travelling in reverse from normal flow. Backfeed source is an improperly installed homeowner generator, and also solar inverters and batteries. Transformer behaviour with backfeed is that it steps up small generator voltage to full primary voltage. Why backfeed matters is that a "de-energized" line can be silently re-energized. Electrical hazard exists when a worker, tool, or object is closer than OR has potential to approach closer than the LOA, which is the OHSA Minimum. Mandatory pre-work inspection is done by a qualified tree worker before climbing, entering, or working in a tree.

Section V, Electrical Safety: Hazard Recognition and Evaluation.

Section IV taught you how electricity injures and kills. Section V teaches you how to keep that from happening, by recognizing, evaluating, and controlling hazards before they reach you. This section is the human-factors heart of the chapter. It covers the three-step safety framework; the three cognitive performance levels of skill-based, rule-based, and knowledge-based;

performance shaping factors; conditioned risk acceptance tolerance; task and worker suitability; job planning including EUSR Rule 107 and the H.O.P.E. process; determining nominal voltage; and the proximity rule. The exam will test you on definitions and recognizing scenarios that fit each concept.

The Three-Step Safety Framework. Critical: every electrical-safety decision follows this three-step framework. Step 1: Recognize the Hazard. Step 2: Evaluate the Hazard and Situation. Step 3: Control the Hazard.

If you cannot recognize a hazard, you cannot evaluate it. If you cannot evaluate it, you cannot choose the right control. Every breakdown in electrical safety traces back to a failure at one of these three steps.

Exam tip: be ready to identify these three steps in order. A common test format presents the steps out of order, or asks "which of the following is NOT a step in the electrical safety framework."

The Three Cognitive Performance Levels. How a worker performs a task depends on how familiar they are with it. The deck identifies three levels. Skill-Based work means familiarity is HIGH, attention is LOW, the worker is very familiar with the task, and performance comes from memory. Rule-Based work means familiarity is moderate, attention is moderate, the worker is moderately familiar, and uses procedures or guidelines. Knowledge-Based work means familiarity is LOW, attention is HIGH, the worker is very unfamiliar and has "never done this before," and work is based on theory.

Why This Matters for Safety: each level has its own characteristic failure mode. Skill-based work leads to errors of inattention. You've done it a thousand times, so you stop paying attention. This is most common in routine tasks. Rule-based work leads to applying the wrong rule, or the right rule in the wrong situation, because procedures don't always cover every variation. Knowledge-based work leads to mistakes from incomplete understanding, because you're thinking through it from first principles and may miss something.

Exam tip: memorize the relationship. Familiarity HIGH equals attention LOW, which is skill-based. Familiarity LOW equals attention HIGH, which is knowledge-based. A common exam question gives a scenario, for example "Tom has done this exact prune fifty times this week," and asks which performance level applies.

Performance Shaping Factors. Even a well-trained worker can be pushed into errors by factors outside their direct control. The deck groups these into four categories.

1. Task Demands: Time Pressure; and Heavy Work Load.

2. Work Environment: Distractions; Interruptions; and Departure from Routine.

3. Individual Capabilities: Training Level; New Technique; and Poor Communication Habits.

4. Human Nature: Stress; Fatigue; Assumptions; and Complacency.

Exam tip: be ready to identify which category a factor belongs to. Time pressure equals task demand. Distractions equals work environment. Fatigue equals human nature. Test questions sometimes ask you to group these correctly.

Conditioned Risk Acceptance Tolerance. Critical: definition. Conditioned Risk Acceptance Tolerance equals "A tolerance of risk or risk taking that is created by the activities and experience of an individual in routinely assigned tasks and which can lead to the repetition of incorrect behaviour or poor work practices."

What This Means in Plain Language: the more often you do something risky and nothing bad happens, the more comfortable you get with the risk, until the risky behaviour feels normal. Eventually you may not even recognize it as risky anymore.

A Practical Example: an arborist climbs a tree without tying in from the ground "just for a quick look." Nothing happens. Next time, same thing. After ten years, climbing without tying in feels normal, until the day a limb gives way and there's no rope to catch them.

Exam tip: Conditioned Risk Acceptance Tolerance is heavily testable because the deck quotes its definition word-for-word. Be ready to recognize: the term itself, sometimes shortened to "CRAT"; the definition, which is a tolerance built up by routine experience; and the consequence, which is repetition of incorrect behaviour and poor work practices.

Note: this concept is closely linked to Complacency under Human Nature in the previous category. Both describe the same underlying problem: familiarity dulling appropriate caution.

Task and Worker Suitability. The key question is: does an individual possess the capabilities to meet the demands and requirements of the task? A worker is "suitable" for a task only if they have: Knowledge; Skill; Experience; and Attitude. Plus documented training, such as a Career Development Program or other program; and ability to recognize and manage performance and risk factors.

Exam tip: four words, Knowledge, Skill, Experience, Attitude, are commonly tested as the components of task and worker suitability. Memorize them as a group.

Cross-reference: the definition of "Competent Person" from LCO Chapter 1, being knowledge plus training plus experience plus familiarity with OHSA plus awareness of hazards, is essentially a formal statement of the same idea. "Competent" in OHSA terms equals "suitable" in human-factors terms.

Hazard Controls and Barriers, The Limitations of PPE. PPE is the last line of defence, not the first. The deck lists five important limitations of PPE.

Critical PPE Limitations: (1), PPE requires regular inspection, maintenance, testing, and training; (2), PPE only protects the individual wearing it, not anyone else in the workplace; (3), PPE is only effective if correctly selected, fitted, used, and cared for; (4), the choice of PPE may compromise mobility, visibility, communication, and so on; and (5), identified hazards are still there. PPE does NOT remove the hazard.

Exam tip: the last item, "identified hazards are still there," is the most important conceptually. PPE is a barrier between the worker and the hazard; it does not eliminate the hazard. The standard hierarchy of controls is: Elimination is first; then Engineering controls; then Administrative controls; then PPE.

Why This Matters: if you treat PPE as your primary protection, you've already failed at the higher levels of hazard control. The first question is always: can the hazard be eliminated? Then: can it be engineered out? Then: can it be controlled administratively? Only at the end: what PPE do I need?

Evaluating Hazards, A Continuous Process. Critical: evaluation is a continuous process, as risk levels can and will change during the course of the job.

A hazard assessment done at the tailboard talk is just the starting point. Conditions change throughout the day. Weather changes include wind, rain, and temperature. Crew composition changes when someone leaves or a trainee arrives. Equipment changes when a tool fails and gets swapped. The work itself changes, for example when a planned prune becomes a removal. And adjacent activity changes when traffic increases or another crew arrives. Each change is a trigger for re-evaluation.

Cross-reference: LCO Rule 304, Tailboard Talk, requires documenting and signing on at three triggers: before work begins; at any change in procedure; and at any change in personnel. These are exactly the moments when re-evaluation is required.

Job Planning. EUSR Definition, Rule 107. Critical: Job Planning Definition from EUSR Rule 107 is a work plan agreed to by all workers involved that: identifies all known hazards; eliminates the hazards where practical; controls the hazards that cannot be eliminated; protects against injury if a hazard gets out of control; minimizes the severity of an injury if one takes place; and identifies each worker's responsibilities in the performance of the work.

Exam tip: the six elements of job planning above are likely test material. Note the hierarchy: identify, then eliminate where practical, then control what can't be eliminated, then protect against escape, then minimize severity if all else fails, then assign responsibilities.

Hazard Assessment and Job Briefing from the Davey Safety and Training Manual: a hazard assessment and job briefing shall be performed by the crew leader or person in charge before beginning work at any job site.

The job briefing shall cover at least the following subjects: (1), hazards associated with the job; (2), work procedures involved; (3), special precautions, such as minimum approach distances;

(4), personal protective equipment; (5), work site set-up; (6), job assignments; (7), emergency response procedure; and (8), energy source controls, which is DIG, meaning De-energize, Isolate, Ground, if necessary.

Exam tip: DIG equals De-energize, Isolate, Ground. This abbreviation appears repeatedly throughout this chapter and is heavily tested. Be ready to spell it out and know what it means.

The Job Planning Process, H.O.P.E. The Davey deck uses the acronym H.O.P.E. to describe the five-step job planning process.

The Five-Step Process: General Hazard Assessment; Hazard Control Measures; Reporting and Managing Unsafe Work; Job Briefing; and Post-Job Review.

The Job Briefing Checklist, Eight Items: every job briefing covers hazards; work procedures; special precautions such as LOA, which stands for Limits of Approach; PPE; work site set up; job assignments; emergency response; and DIG, if necessary.

Exam tip: both the five-step process and the eight-item briefing checklist are testable. Note that the eight items match the eight subjects required by the Davey Safety and Training Manual and EUSR.

Determining Nominal Voltage. Before you can apply Limits of Approach, you have to know what voltage you're working near.

Definition. Critical: Nominal Voltage Definition. Nominal voltage equals the maximum potential operating voltage, phase-to-phase, in the energized conductors for the type, design, hardware, and configuration of electric construction.

How to Determine Nominal Voltage: two main approaches are circuit maps, which are the only fully reliable source, and visual cues such as number of insulators, taller poles or structures, and greater conductor separation, which are rough indicators only.

The Cautions. Critical: Two Major Cautions. Number 1: the covering on conductors is NOT insulation. It is weatherproofing to protect the wires. Number 2: only a circuit map will accurately and reliably tell you the voltage of a line, and only under normal conditions.

Exam tip: the phrase "only under normal conditions" is significant. Backfeed, fault conditions, switching errors, and abnormal events can put unexpected voltages on lines that "should" be at a different voltage or de-energized entirely. A circuit map is your best guide, but treat it as a normal-conditions reference, not an absolute guarantee.

Cross-reference: Hendrix cable from Section III covers covered conductors that are not touch-safe. EUSR Rule 145 states that all covered, jacketed, or insulated overhead conductors above 750 V are treated as bare. And LCO Rule 800 number 10 states that weatherproof covering is not insulation.

Proximity, The Big Definition. This is one of the most important definitions in the entire chapter.

Critical: Proximity. If a worker brings themselves, a tool, whether insulated or not, or any other conductive object within the OHSA Limits of Approach, they are considered to be within proximity, and all "line clearing" policies, procedures, and regulations apply, even if the worker is not involved in "line clearing operations."

Three implications: insulated tools do not exempt you from proximity rules, because "insulated" is not a free pass; you don't have to be a line clearance arborist to be in proximity, because a residential arborist on a routine prune who comes within the LOA is in proximity and bound by the same rules; and conductive objects count, because a pole pruner, a ladder, a rope, or even brush you're carrying, if any of these enters the LOA, you are in proximity.

The Tree-Specific Rule. Critical: The Whole-Tree Rule. Trees are excellent conductors of electricity. If any part of a tree is encroaching minimum proximity limits, the ENTIRE structure is to be considered within proximity.

So if even one branch tip enters the LOA, the whole tree, including every limb, every branch, and every part of the trunk you might touch, is treated as being in proximity.

Exam tip: this is one of the most likely exam questions in the entire chapter. Be able to recite: proximity applies to workers, tools whether insulated or not, and any conductive object; line-clearing rules apply even to workers not doing line clearance work; and if any part of a tree is in proximity, the whole tree is in proximity.

Proximity in Practice, A Worked Example. The deck gives this scenario. A tree with a 60 ft. spread is growing 8 ft. from a 16 kV conductor installed approximately 30 ft. above the ground. A crew has been sent to elevate the tree to 10 ft. over a sidewalk for pedestrian clearance. The question is: will the crew be in proximity while trimming this tree?

Working Through It: voltage is 16 kV, which falls in the 750 V to 35 kV range, so the OHSA general minimum is 3 m, or 10 ft., and the Authorized Person minimum from Table 1 and Table 9 is 0.9 m, or 3 ft. Geometry: the tree has a 60 ft. spread. The conductor is only 8 ft. from the trunk. That means branches on the conductor's side of the tree are already very close to the conductor, likely well within 3 m, or 10 ft. Tree-as-conductor rule: if ANY part of the tree is within proximity, which it almost certainly is given the geometry, the entire tree is in proximity. Tool rule: even before climbing, a pole pruner reaching up into the canopy is a conductive object that may enter the LOA.

Critical: Answer is YES. The crew will be in proximity. Even though they're elevating the tree over a sidewalk and not doing "line clearing," they are working in proximity to an energized conductor, so all line-clearing policies, procedures, and regulations apply.

Exam tip: expect a similar applied scenario on the exam. The pattern is: (1), identify the voltage and look up the LOA; (2), check the geometry and ask whether any part of the tree or the

worker's tool enters the LOA; (3), if yes, the entire tree is in proximity, even if the work is not "line clearing."

Section V key facts to memorize: three-step safety framework is Recognize, then Evaluate, then Control. Three cognitive performance levels are Skill-based, Rule-based, and Knowledge-based. Skill-based work has familiarity HIGH, attention LOW, and performance from memory. Rule-based work has moderate familiarity, moderate attention, and uses procedures. Knowledge-based work has familiarity LOW, attention HIGH, and work based on theory. Four categories of performance shaping factors are Task Demands; Work Environment; Individual Capabilities; and Human Nature. Task Demand examples are time pressure and heavy work load. Work Environment examples are distractions, interruptions, and departure from routine. Individual Capabilities examples are training level, new technique, and poor communication habits. Human Nature examples are stress, fatigue, assumptions, and complacency. Conditioned Risk Acceptance Tolerance is a tolerance of risk created by routine activity that leads to repetition of incorrect behaviour. Task and Worker Suitability components are Knowledge, Skill, Experience, and Attitude, plus documented training and ability to recognize and manage risk. Five PPE limitations are that it requires maintenance and training; protects only the wearer; is only effective if used correctly; may compromise mobility, visibility, and communication; and identified hazards are still there. Hazard evaluation is a continuous process, and re-evaluate at every change. Job planning from EUSR Rule 107 has six elements: identify hazards; eliminate where practical; control what can't be eliminated; protect against escape; minimize severity; and assign responsibilities. Job briefing is performed by the crew leader or person in charge. Job briefing covers eight subjects: hazards; work procedures; special precautions including LOA; PPE; work site set-up; job assignments; emergency response; and DIG if needed. H.O.P.E. five-step process is General Hazard Assessment; Hazard Control Measures; Reporting and Managing Unsafe Work; Job Briefing; and Post-Job Review. DIG stands for De-energize, Isolate, Ground. Nominal voltage is the maximum potential operating voltage, phase-to-phase, for the construction. Only reliable voltage source is a circuit map under normal conditions. Covering on conductors is NOT insulation, it is weatherproofing only. Proximity rule for workers applies to worker, tool whether insulated or not, or any conductive object within LOA. Proximity rule for work type applies even when worker is NOT doing line-clearing work. Whole-tree rule states that if any part of tree is in proximity, the entire structure is in proximity.

Section VI, Authorization, Knowledge, and Hold-Offs.

Section VI answers three questions: who is allowed to work in proximity, which is Authorization; what must they know before they start, which is Knowledge; and what protective device is often confused with isolation but doesn't actually protect people, which is Hold-Offs. The Authorization and Hold-Off rules are heavily tested. The hold-off question almost always shows up on the exam because it's such a common point of confusion.

Authorization for Work, EUSR Rule 106. Critical: EUSR Rule 106, Authorization for Work. Only authorized workers, or workers under the direction of an authorized worker, may perform work on or in proximity to exposed energized apparatus.

This is the foundational rule. No matter how skilled, experienced, or well-equipped you are, if you are not authorized, or directly supervised by someone who is, you cannot legally work in proximity.

Definition of Authorized Worker under the EUSR. Critical: Authorized Worker equals a worker who has been given formal permission by the owner AND employer, and is competent to perform work in proximity to energized apparatus.

Three components are required: formal permission from the OWNER, which is the utility; formal permission from the EMPLOYER, for example your arborist company; and competence to do the work.

Exam tip: the deck and EUSR phrase this as "by the owner AND employer," not "either/or." Both authorizations are required. Missing either one means the worker is not authorized.

Cross-reference: this definition matches the Authorized Worker definition in LCO Chapter 1 Definitions: "A worker who has been given formal permission by the owner and employer and is competent to perform work in proximity to equipment energized at voltages greater than 750 V nominal."

The Two Authorizations in Detail.

Authorization Number 1, From the Utility Owner: most utility owners delegate the power of authorization to their utility controllers, who act as the controlling authority. What the Controlling Authority Does: it mandates the qualifications a worker must have to work within proximity to conductors under their control; for example, the worker must have completed the IHSA Line Clearance Safety and Awareness Course; qualifications are typically assessed during the contract bidding process; and a list of "authorized personnel" is produced from the controlling authority for the contract.

Exam tip: the controlling authority is not just a paperwork formality. They decide what training counts, and they maintain the list of who is allowed near their lines. If you're not on the list, you're not authorized for that utility, period.

Authorization Number 2, From the Employer: for a major arborist company, employer authorization works in two tiers.

Tier 1, Qualified Residential and Commercial Arborists: these workers have had the required electric hazard awareness training, and may trim trees within 10 ft. of: telephone lines; cablevision lines; other communicating lines; and low voltage service wires less than 750 V.

Tier 2, Arborists Who Are NOT Qualified Line Clearance Arborists: these workers shall maintain a Minimum Approach Distance, or MAD, of at least 10 ft. or 3 m from energized electric conductors, in accordance with LOA.

Critical: Minimum Approach Distance, or MAD. For a worker who is NOT a qualified line clearance arborist, the minimum approach distance to any energized electric conductor is 10 ft., or 3 m, matching the OHSA Construction Regulation general minimum.

Exam tip: note the term MAD, which stands for Minimum Approach Distance. The deck uses MAD essentially interchangeably with the OHSA Minimum column of the LOA table. Both mean: the 10 ft. or 3 m rule that applies to anyone not specifically authorized to use the closer Authorized Worker distances.

Authorization, The Main Points. Critical: Two Authorizations Required. Workers must be authorized by BOTH the utility owner AND the employer to work in proximity to electrical conductors. From the owner: as prescribed by the Owner and Controlling Authority. From the employer: Qualified Line Clearance Arborist, OR under the direct supervision of a Qualified Line Clearance Arborist, AND conforming with all applicable regulations, policies, and procedures.

Two Tested Application Scenarios: the deck gives two scenarios with the same answer, which is YES, authorization is still required.

Scenario 1, Existing Line Clearance Contract Doesn't Cover Residential Work. A company holds the contract to clear lines for ABC Utility. An arborist is sent to climb and remove dead limbs from a tree growing within the Limits of Approach under a residential work order. Does the residential arborist still need to request authorization from ABC to work on the tree, since the company holds the contract for line clearance? The answer is YES. The company's line-clearance contract does not automatically extend to residential work orders. Each job in proximity requires its own authorization from the controlling authority.

Scenario 2, Day-by-Day Authorization. A Certified Utility Arborist working for the company has been working on the same power circuit for ABC for three days. Do they still require formal authorization to work within proximity on day four? The answer is YES. Authorization is typically granted on a daily basis, along with hold-offs. Yesterday's authorization does not carry over.

Exam tip: both scenarios share the same lesson: authorization is per-job, not blanket. Be ready to apply this principle to similar fact patterns on the exam.

Cross-reference: LCO Rule 103, Work Methods, states: "Prior to work commencing, the supervisor of the line clearing crew is required to notify the power authority of the work location and is required to acquire work protection on lines and or apparatus." This notification and protection acquisition is part of the daily authorization process described here. The two chapters describe the same workflow from different angles.

Knowledge, EUSR Knowledge of Rules. Critical: EUSR Knowledge of Rules. Workers conducting work on or in proximity to exposed apparatus of an electrical distribution or

transmission system: (1), shall have a copy of these safety rules; (2), shall be trained in the application of the rules; and (3), shall follow all rules applicable to their particular duties AND to the duties of any employee they supervise.

Exam tip: three requirements are have, trained, and follow. A worker isn't just expected to follow the rules. They must have a physical copy of them and be trained in their application. The third requirement extends responsibility upward to supervisors, because they must know their own duties AND the duties of those they supervise.

The Second-Worker Requirement from the Davey Safety and Training Manual. Critical: Second Qualified Worker Required. A second qualified line clearance arborist or line clearance arborist trainee shall be within vision or voice communication during line clearing operations aloft when the line clearance arborist, or trainee, must approach more closely than 3 m to any energized electrical conductor or electrical apparatus energized in excess of 750 V, which is primary, OR when: (1), branches or limbs being removed cannot first be cut with a pole pruner or saw sufficiently to clear electrical conductors and avoid contact; or (2), rigging is required to remove branches or limbs from such conductors or apparatus, for example a transformer.

Three Triggers for the Second Worker: the second-worker requirement kicks in when any of these three conditions are met. Trigger 1, Distance: working closer than 3 m to a primary conductor or apparatus over 750 V. Trigger 2, Cut sequence: cannot pre-cut the branch with pruners or saw to safely clear conductors before removal. Trigger 3, Rigging: rigging is required for removal, for example transformer access.

Cross-reference: LCO Rules requiring a second worker are LCO Rule 103-C number 1, which states no worker may work aloft in trees without a second worker in attendance and the second worker must be competent in rescue; and LCO Rule 103-N number 1, which states when a worker is aloft in an aerial device, a second worker must be available and competent to effect a rescue. The LCO rules cover the rescue capability angle. The AIP rule above adds the electrical-proximity angle: even if rescue capability is otherwise in place, the second qualified arborist must be in vision or voice communication during proximity work.

Exam tip: "Vision OR voice communication," not radio only and not phone only. The second worker must actually be able to see OR directly hear the worker aloft. A hand-held radio out of voice range doesn't satisfy this requirement.

The Overarching Compliance Rule: employees must abide by all employer rules and procedures AS WELL AS government regulations. This restates the most-stringent rule from Section I. Both sets apply.

Hold-Offs. This is one of the most heavily tested and most commonly misunderstood concepts in the entire curriculum.

Definition. Critical: Hold-Off Definition. A hold-off equals a device having its operation restricted to previously agreed limits by the placement of a hold-off tag. Most commonly used to block the automatic reclosing or the manual re-energization of a line following an automatic trip.

EUSR Rule 117, Establishment of Hold-Offs. Critical: where the electrical system equipment exists, a hold-off shall be established for equipment protection, and must NOT be used in place of a work permit, whenever: an employer, supervisor, worker, or controlling authority considers it necessary, or it is determined during job planning.

Exam tip: note the four parties who can trigger a hold-off request: employer, supervisor, worker, or controlling authority. Any one of them can call for a hold-off if they consider it necessary.

How a Hold-Off Actually Works.

The Recloser Problem: modern distribution circuits use reclosers, which were covered in Section III. When a fault occurs, for example a tree limb hits a line and trips the circuit, the recloser automatically tries to re-energize the line, typically up to three times, before locking out. This is normally a good thing because most faults are temporary, and automatic reclosing restores service without sending a crew. But for an arborist working on or near that line, automatic reclosing is deadly. The line that just tripped because of YOUR tree contact will be re-energized, silently and automatically, within seconds.

What the Hold-Off Does. Critical: a hold-off blocks the automatic reclosing OR the manual re-energization of a line following an automatic trip. The circuit stays open after one trip instead of trying to close three times.

The hold-off tag tells the utility's control room: do not re-energize this line until the tag is removed.

How Hold-Offs Are Issued: most utilities will issue hold-offs for circuits where authorized workers are in proximity. Hold-offs are granted and surrendered on a daily basis.

Exam tip: like authorization, hold-offs are per-day. Yesterday's hold-off does not carry over to today.

The Most Important Hold-Off Rule. Critical: The Hold-Off Distinction. Hold-offs are for the protection of the utility's EQUIPMENT only, and offer NO protection to a worker in proximity. Hold-offs MUST NOT be used in place of a work permit.

This is the single most-tested point in Section VI. The hold-off does NOT make the line de-energized. It does NOT isolate the circuit. It does NOT ground the line. It does NOT protect the worker from electric shock. It ONLY prevents automatic re-closing if a trip occurs.

The line is STILL ENERGIZED under a hold-off. All proximity rules, all PPE requirements, and all Limits of Approach, every one of them still applies.

Exam tip: the exam will almost certainly test this distinction. Be able to state it cleanly. Hold-off equals protects EQUIPMENT and prevents auto-reclose, and the line is STILL ENERGIZED. Work permit and Isolation plus De-energization equals protects PEOPLE, and the line is DE-ENERGIZED.

Why This Matters: workers who believe a hold-off means "the line is safe" make the most dangerous assumption in line clearing. The hold-off only protects you from the consequences of an accidental fault you cause. It does nothing to protect you from the line itself.

Cross-reference: the same distinction appears in LCO Rule 305, Utility Work Protection Code. Work permit equals isolation plus de-energization and protects people. Hold-off equals prevents auto-reclose and protects equipment, with the apparatus still energized. This concept is reinforced again in EUSR Rule 117. Three chapters, same lesson. Expect it on the exam.

Section VI key facts to memorize: Authorization for work is EUSR Rule 106. Who may work in proximity is authorized workers OR workers under direction of an authorized worker. Authorized Worker definition requires formal permission from owner AND employer, AND competence. Authorization from utility owner is typically delegated to utility controllers, which is the controlling authority. Example owner qualification is IHSA Line Clearance Safety and Awareness Course. Authorization frequency is daily, not blanket, and is per-job. Tier 1 employer authorization allows trimming trees within 10 ft. of communication lines such as phone and cable, and low voltage service wires under 750 V. Tier 2, which covers non-line-clearance arborists, means MAD equals 10 ft. or 3 m from energized conductors. MAD stands for Minimum Approach Distance. Knowledge of Rules has three requirements: (1), have a copy of the rules; (2), be trained in their application; (3), follow rules for own duties AND duties of those supervised. Second-worker is required when one of three triggers applies: (1) closer than 3 m to conductors over 750 V; (2) can't pre-cut branch to clear conductors; or (3) rigging required. Second worker communication requires vision OR voice, not radio-only. Hold-off, what it does: blocks automatic reclosing OR manual re-energization of a line following an automatic trip. Hold-off EUSR rule is Rule 117. Hold-off number of trip cycles it prevents is up to 3, which is typical recloser behaviour. Hold-off, who can request it: employer, supervisor, worker, OR controlling authority. Hold-off frequency is granted and surrendered daily. Hold-off, what it protects: EQUIPMENT, which is the utility's apparatus. Hold-off, what it does NOT protect: PEOPLE, because the line is still energized. Hold-off, relationship to work permit: MUST NOT be used in place of a work permit. Line status under a hold-off is STILL ENERGIZED.

Section VII, PPE for Proximity Work.

Section VII is technical and specification-heavy. It covers the five required types of PPE for proximity work: arc-rated and flame-resistant clothing; hard hat; footwear; eyewear; and rubber gloves with leather protectors. Most of the exam questions for this section ask about specific numbers and categories: which class of rubber glove for which voltage, what HRC level for what arc rating, what hard hat class is required, and so on. Expect direct memorization questions.

Cross-reference: some material overlaps with LCO Rule 301, Suggested Tools and Equipment, particularly Class E hard hats, the rubber glove table, and the general PPE list. Where the LCO and AIP statements differ, the more stringent rule applies. The AIP rubber glove classes are slightly more granular than LCO's.

PPE Requirements, The Main Summary. Critical: Required PPE for All Davey Employees in Proximity in Ontario. Number 1: Arc Flash rated pants and long-sleeved shirt. Number 2: Class E hard hat. Number 3: Approved eye protection. Number 4: Approved foot protection. Number 5: Rubber gloves.

Note: Grounds Personnel. Some utility clients require grounds people to meet the same PPE requirements as those in proximity, minus rubber gloves. Check with your local supervisor for client-specific requirements.

Clothing, Arc-Rated and Flame-Resistant, or FR.

EUSR Clothing Rule: when working on or in proximity to exposed energized apparatus, FR clothing and approved protective equipment must provide an adequate level of protection to protect the worker; the outer layer of clothing must be made of arc flash, flame-resistant material; and clothing worn in conjunction with arc-flash, flame-resistant clothing must not contribute to increased worker injury.

The Underlayer Rule. Critical: Under-Garment Restriction. When wearing arc-flash or FR outer clothing, only natural fibres may be worn underneath: cotton; wool; and silk.

Exam tip: this rule exists because synthetic fibres such as polyester, nylon, and acrylic melt when exposed to high heat, fusing to skin and dramatically worsening burn injuries. Even if your outer FR shirt protects you from the flame, a synthetic undershirt can still melt onto you. Natural fibres char rather than melt.

Flame Resistant, FR, Definition. Critical: FR Definition. Flame Resistant, or FR, equals the property of a material whereby combustion is prevented, terminated, or inhibited following the application of a flaming or non-flaming source of ignition, with or without subsequent removal of the ignition source. Flame resistance can be: an inherent property of the material, for example Nomex or wool; or imparted by a specific treatment applied to the material. Plain-language summary: the material doesn't continue to burn once the source is removed.

FR vs. Arc-Rated, or AR. This distinction is heavily tested. The deck spells out both categories side by side. FR Clothing is tested using the vertical flame method, does not continue to burn once the initial hazard is over, and limits burn injury to the surface area directly impacted. It also insulates the wearer from thermal hazard, reducing or eliminating second or third degree burns through the garments. Arc-Rated, or AR, Clothing is tested using arc flash, and all AR clothing is also FR rated. It measures insulation against the heat capable of causing a second-degree burn 50% of the time.

Critical: all AR clothing is FR rated. NOT all FR clothing is AR rated.

In other words: AR is a stricter standard than FR. AR clothing has been tested specifically against an electrical arc and given a quantitative rating; FR clothing only has to pass a vertical flame test.

Exam tip: a common exam question asks you to identify which statement is true. "All AR is FR" is TRUE. "All FR is AR" is FALSE. Get this relationship right and you'll catch the trick.

Arc Thermal Performance Value, or ATPV. Critical: ATPV Definition. An arc rating, or ATPV, means that you have a 50% chance of being burned to second degree if exposed to an electric arc with the same number of calories of heat.

Reference Scale. Critical: one calorie per centimetre squared equals approximately the heat of holding your finger over the tip of a flame from a cigarette lighter for one second. This is how the trade reasons about garment ratings: a higher calorie per centimetre squared rating means the garment can survive longer exposures and protect against larger arcs.

The HRC, or Hazard Risk Category, Levels. Critical: HRC Levels and Arc Ratings. HRC 0 has a minimum arc rating of 0.0 cal per cm squared and a maximum of 0.0. HRC 1 has a minimum of 4.0 and a maximum of 7.9. HRC 2 has a minimum of 8.0 and a maximum of 24.9. HRC 3 has a minimum of 25.0 and a maximum of 39.9. HRC 4 has a minimum of 40.0 with no upper limit.

Exam tip: memorize the lower boundary of each HRC level. Those are the round numbers most likely to appear as test answers. HRC 0 is 0 cal per cm squared. HRC 1 is 4 cal per cm squared. HRC 2 is 8 cal per cm squared. HRC 3 is 25 cal per cm squared. HRC 4 is 40 cal per cm squared and above. A common test pattern is: "A garment rated 12 cal per cm squared is what HRC level?" The answer is HRC 2, because 8 is less than or equal to 12 which is less than 25.

Care and Maintenance of AR and FR Clothing. Critical: AR and FR Maintenance Rules. Number 1: all AR and FR clothing is to be free of holes or tears. Number 2: any repairs must be made with materials equivalent to the original materials in the garments.

What Counts as "Equivalent": examples of equivalent repair materials include Nomex sewing thread; FR mending fabrics equal to the materials used in the original garment; and heat-seal FR patches, which are often used for small repairs.

Note: equivalence extends beyond fabric. Zippers, trim, and other findings must also be replaced with equivalent FR materials. A regular nylon zipper in an FR garment is a failure point.

Exam tip: repairing FR clothing with non-FR thread, for example ordinary cotton or polyester thread, destroys the garment's FR rating at the seam. This is a classic exam trap.

Hard Hats. Critical: Hard Hat Requirement. All hard hats used on-site must be: employer-supplied; and Class E rating.

Why Class E: Class E hard hats are the only class dielectrically tested for high-voltage protection, specifically 20,000 V phase-to-ground. They are required for all proximity work.

Cross-reference: LCO Rule 301-A, Head Protection, specifies the same Class E hard hat with the same 20,000 V dielectric strength test, and notes that spraying chemicals and bug repellent can deteriorate the hard hat material.

Footwear. Critical: Footwear Requirements. All footwear worn on-site must be: CSA approved; dielectrically tested; and provide above-the-ankle support.

Exam tip: note that AIP adds "dielectrically tested" as an explicit requirement for footwear. This is a tighter standard than the LCO footwear requirements, which require CSA approval and safety toe caps but don't explicitly require dielectric testing.

Cross-reference: LCO Rule 301-C also requires non-slip impermeable soles, ballistic nylon and Kevlar lining for chainsaw ground work, and soft soles for climbing.

Eyewear. Critical: Eyewear Requirements. All eyewear must be: employer-supplied; and meet CSA standards, or equivalent.

Cross-reference: LCO Rule 301-B, Eye Protection, lists when eye protection must be worn, including operating chainsaws, chippers, brush saws, and circular saws; pouring and mixing chemicals; and any debris hazard. It also identifies four acceptable types: protective spectacles with side shields; cover goggles; a full face screen on the hard hat; and a full face shield on the hard hat, with the shield and screen requiring spectacles or goggles underneath.

Rubber Gloves, The Most Heavily Tested PPE.

EUSR, Rubber Glove Class Selection. Critical: Rubber Glove Class Selection from EUSR and Line Clearing Operations. Workers shall wear the appropriate rubber gloves with leather protectors when the worker or that which is being worked on is within 3 m, or 10 ft., of energized apparatus, as follows. Up to 500 V nominal requires Class 00. Up to 750 V nominal requires Class 0. Up to 5 kV nominal requires Class 1. Over 5 kV and up to 50 kV nominal requires Class 2.

Exam tip: this is one of the most heavily tested tables in the entire AIP chapter. Memorize the four voltage-to-class pairs. 500 V or less equals Class 00. 750 V or less equals Class 0. 5 kV or less equals Class 1. 5 kV to 50 kV equals Class 2.

How This Compares to the LCO Rubber Glove Rule: the LCO rubber glove rule, which is Rule 301-D and reinforced in Rule 1000 number 5, is simpler. It requires Class 2 minimum for any worker within 3 m of apparatus energized between 750 V to 50,000 V, per LCO Rule 301-D, or 0 to 50,000 V per LCO Rule 1000 number 5.

Cross-reference: how the rules interact. The AIP rule gives a more granular graduated scale where lower voltages allow lower-class gloves. The LCO rule sets a more conservative Class 2 floor within 3 m of any apparatus. The most-stringent rule wins. In practice: Class 2 minimum for primary distribution work above 750 V, graduated down for service-level work below 750 V.

The Critical Disclaimer. Critical: from the Davey Safety and Training Manual. Rubber gloves, with or without leather or other protective covering, shall NOT be considered as providing any measure of safety from electric hazards.

Exam tip: this is one of the most counter-intuitive and heavily tested rules in the chapter. Rubber gloves are required PPE, but they are explicitly NOT considered a measure of safety from electric hazards. They are a last line of defence, not a primary safety control. The reason: rubber gloves protect against incidental contact at their rated voltage, but they fail in many real-world scenarios including puncture, contamination, voltage exceeding rating, and contact through a defect. The real safety comes from Limits of Approach, isolation, and de-energization, not from the gloves.

EUSR Rule 135, Rubber Glove Work. EUSR Rule 135 establishes how rubber gloves must be used. Four main points. Critical: EUSR Rule 135 Main Points. Number 1: workers required to wear rubber gloves shall be trained in the proper Class selection, and the care and use of rubber gloves and leather protectors. Number 2: only rubber gloves that have received initial acceptance tests in accordance with ASTM specifications and sized to fit the worker shall be issued. Number 3: gloves shall be marked with a legible expiry date and shall never be used beyond this date. Number 4: protective covers must be used in conjunction with rubber gloves, and never be used separately as a work glove.

Exam tip: point 4 is a classic exam question. The leather protector is NOT a work glove. Wearing the leather protector alone, without the rubber glove inside, is a violation. Both are worn together, always.

Rubber Gloves, Care, Use, and Maintenance. Critical: Daily Use Requirements. Rubber gloves shall be: (1), air tested AND visually inspected each day, prior to use; (2), exchanged when damaged OR when the worker to whom they are assigned has reason to doubt their condition; (3), stored away from energized electrical apparatus where ionization or corona, such as sunlight, may be present; (4), used only with approved protective covers; and (5), never worn inside out.

Critical: jewelry must not be worn while wearing rubber gloves.

Exam tip: two reasons jewelry is prohibited. First, rings, watches, and bracelets can puncture the rubber from inside, breaching the dielectric protection. Second, jewelry is conductive metal, and in a fault, it concentrates current at the wrist or finger, intensifying injury.

Cross-reference: LCO Rule 302 number 1 covers the rubber glove inspection procedure in much greater detail, including the daily air test procedure of turning inside out, inspecting, reversing, twirling to fill with air, squeezing and holding near the face for leaks; the colour-coded class table of Beige, Red, White, Yellow, Green, and Orange for Classes 00, 0, 1, 2, 3, and 4; the 90-day retest requirement; and the storage rules. The enemies of rubber, which are chemicals, oils, sunlight, UV, dampness, and heat, are why gloves must be stored away from energized apparatus where ionization or corona can damage the rubber.

Removing Rubber Gloves for Specific Jobs. There are rare exceptions where rubber gloves can be removed, but only under tightly controlled conditions. Critical: Glove Removal Rule. When performing overhead rubber glove work, certain jobs present undue difficulty while wearing

rubber gloves. In such cases: (1), measures must first be taken using rubber gloves to provide a protected area that will guard against any possibility of inadvertent contact with energized apparatus; (2), removal is at the discretion and with the permission of the worker at the worksite immediately in charge of the work; (3), other appropriate hand protection must be used during the interval of the specific job; and (4), rubber gloves shall be worn when approaching AND leaving the protected area.

The Ontario and Davey Additional Requirement. Critical: Ontario and Davey Additional Rule. Formal, documented permission must be obtained from the controlling authority AND the Davey Regional Manager prior to removing gloves under this clause for Davey employees in Ontario.

Exam tip: this is the most-stringent rule wins principle at work. The EUSR allows discretion at the worksite. Davey plus Ontario add a two-layer documented approval requirement, being both the controlling authority and the regional manager. Both must be in writing, in advance.

Limits of Approach, Initial Reference. The deck introduces the Limits of Approach table here, but covers it in detail in the next section. Exam tip: How to Read the LOA Table. Step 1, determine the nominal voltage of the conductor per Section V. Step 2, for authorized workers or trainees under direct supervision, look across the Authorized Worker column for the minimum approach distance. Step 3, for all non-authorized workers, use the OHSA Minimum column, which is 3 m or 10 ft. for any line over 750 V.

Cross-reference: full LOA tables are in EUSR Rule 129, which is covered in Section VIII of this chapter and again in the EUSR chapter.

Two Tested Application Scenarios.

Scenario 1, Showing up Underprepared. A worker is sent to trim a tree for a residential client and arrives to find the tree is in proximity. The worker is wearing "Davey greens," which is standard work clothing that is NOT arc-rated, and has no insulated tools on board. Should the worker proceed with the job? The answer is NO. Why: proximity requires arc-rated outer clothing, insulated tools when within LOA, and the full PPE kit. Showing up without arc-rated clothing or insulated tools means the worker is not equipped to work in proximity. The job must be deferred until proper PPE and equipment are obtained.

Scenario 2, Illegible Inspection Sticker. A utility arborist is trimming a tree using an insulated pole pruner when he notices that the sticker is illegible. If the pole was tested recently, and the arborist is confident in its insulating properties, are they permitted to use the pole for the remainder of the day? The answer is FALSE, which means NO.

Why: the inspection sticker is the proof of the insulating properties. Without a legible sticker, the tool is not considered tested. Confidence is not enough. The tool must be removed from service and re-tested before further use.

Exam tip: The General Principle. "If it's not tested and stickered, it's not insulated." This will be repeated in Section VIII. It applies to pole pruners, pole saws, aerial devices, FRP tools, and ladders. No valid sticker equals not insulated, period.

Section VII key facts to memorize: five required PPE items in proximity are (1) arc-rated long-sleeve shirt and pants; (2) Class E hard hat; (3) approved foot protection; (4) approved eye protection; and (5) rubber gloves. Outer layer requirement is arc-flash, flame-resistant material. Underlayer requirement is only natural fibres of cotton, wool, and silk. Why no synthetic underlayers is that synthetics melt and fuse to skin. FR definition is combustion prevented, terminated, or inhibited, and it doesn't continue to burn once ignition source removed. AR versus FR relationship is that all AR is FR; NOT all FR is AR. FR test method is vertical flame. AR test method is arc flash. ATPV meaning is 50% chance of second-degree burn at the rated cal per cm squared. 1 cal per cm squared reference is a cigarette lighter flame on finger for 1 second. HRC 0 arc rating is 0 cal per cm squared. HRC 1 minimum arc rating is 4 cal per cm squared. HRC 2 minimum arc rating is 8 cal per cm squared. HRC 3 minimum arc rating is 25 cal per cm squared. HRC 4 minimum arc rating is 40 cal per cm squared and above. AR and FR repair requirement is equivalent FR materials, for example Nomex thread. Hard hat class is Class E and employer-supplied. Class E dielectric test is 20,000 V phase-to-ground. Footwear requirements are CSA approved, dielectrically tested, and above-the-ankle support. Eyewear requirements are employer-supplied and CSA standards or equivalent. Rubber glove for 500 V or less requires Class 00. Rubber glove for 750 V or less requires Class 0. Rubber glove for 5 kV or less requires Class 1. Rubber glove for 5 kV to 50 kV requires Class 2. Rubber glove trigger distance is within 3 m, or 10 ft., of energized apparatus. Davey Safety and Training Manual disclaimer on rubber gloves is that they are NOT considered to provide any measure of safety from electric hazards. EUSR Rule for rubber glove work is Rule 135. Rubber gloves must be tested using initial acceptance per ASTM and sized to fit. Rubber glove expiry must be marked with legible expiry date and never used beyond it. Leather protector usage is worn WITH rubber glove and never used separately as a work glove. Daily glove requirements are air tested AND visually inspected; exchanged if damaged or doubted; never worn inside out; and stored away from corona and ionization. Jewelry while wearing rubber gloves is NOT permitted. Glove removal exception applies only with rubber gloves first establishing protected area; permission of worker in charge; other hand protection used; and gloves worn when approaching and leaving area. Ontario and Davey glove removal requires formal documented permission from controlling authority AND Regional Manager. Universal sticker rule is: if it's not tested and stickered, it's not insulated.

Section VIII, Limits of Approach and Insulated Tools.

Section VIII brings together two interlocking topics: how to read and apply the Limits of Approach, or LOA, table, and what qualifies as insulated equipment, how it must be tested, and what does not qualify no matter how it looks.

Determining Limits of Approach. Once the nominal voltage is determined, apply the correct LOA column. The OHSA Minimum tier applies to any worker not meeting authorized conditions, with a minimum clearance of 3 m, or 10 ft., for any line over 750 V. The Authorized Worker tier applies to workers meeting all four authorization conditions, with a minimum clearance of 0.9 m, or 3 ft., at 750 V to 35 kV.

Exam tip, step-by-step LOA application: (1), determine nominal voltage from a circuit map; (2), check authorization status; (3), read the correct column for the voltage range; and (4), apply the limit to the worker, tools whether insulated or not, material, vegetation, AND planned movements.

Cross-reference: full Authorized Worker clearance table from EUSR Rule 129, which is the same as LCO Table Number 9. 750 V to 35 kV equals 0.9 m, or 3 ft. Greater than 35 kV to 50 kV equals 1.2 m, or 4 ft. Greater than 50 kV to 150 kV equals 1.5 m, or 5 ft. Greater than 150 kV to 250 kV equals 2.1 m, or 7 ft. Greater than 250 kV to 550 kV equals 3.7 m, or 12 ft. Class 2 rubber gloves are also required within 3 m of 0 to 50 kV apparatus, independently of the LOA column used. See LCO Rule 1000 number 5.

Insulated Tools and Equipment, General Rules: initial acceptance tests, regular inspections, electrical retesting, and maintenance practices must be followed; testing shall be performed by a certified laboratory; the expiry date must be clearly shown on the piece of equipment; equipment must NEVER be used beyond the expiry date; if the expiry date is not visible, the equipment shall NOT be used and must be returned for laboratory retesting; and when defects such as cracks, bruises, punctures, or other abnormalities are detected through inspection, equipment must be removed from service and returned to a certified laboratory for retesting.

Pole Tools and Pruners. Critical: pole tools and pruners used for work within proximity shall be: (1), insulated; (2), with a valid inspection sticker attached; and (3), have an insulated insert in the rope. Hydraulic-powered pole tools used within proximity shall be insulated with a valid inspection sticker attached, with no rope insert required.

The Universal Rule. Critical: if it's not tested and stickered, it's not insulated. No exceptions. No "I'm confident it was tested." No "the sticker fell off but it was done last month." No current, legible sticker equals not insulated equals cannot be used in proximity.

Exam tip: this phrase appears three times in the deck and is virtually guaranteed to appear on the exam. Memorize it word-for-word.

Hydraulic-Powered Chainsaw. Description: a hydraulically-powered saw head mounted on a dielectric pole. Hydraulic hoses must also be non-conductive, because a conductive hose running the length of the pole defeats its insulation. Chain maintenance is the same as for a gas-powered chainsaw.

Daily Inspection and Maintenance: for the head of the chainsaw, check bolts for tightness, seals for leaks, and bar for tightness and proper chain tension. For the dielectric pole, check for nicks, gouges, breaks, cracks, contamination, or any other defects. For the chainsaw handle, check

connections for leaks and trigger for return spring. For hydraulic hoses, check for wear, cracks, or leaks.

Critical: NEVER check hydraulic hoses for leaks with your bare hands. Hydraulic oil is under pressure and can penetrate hands and fingers. It is hazardous to health if ingested or absorbed, and this is called pressure intoxification.

Cross-reference: same hazard as LCO Rule 400 number 10. Use a piece of cardboard or paper to detect leaks, never bare hands.

Pole Pruner. Used for removal of branches up to the capacity of the hook. Additional pole sections may be connected to reach the work.

Critical: 16-Foot Caution. Caution should be taken when connecting handles to equal 16 ft. or more in length. They can become difficult to control and increase the risk of back and shoulder injury.

Daily Inspection and Maintenance, Pruner Head: for bolts and rivets, check that they are just loose enough to allow free action, and check for enlargement of bolt holes. For the coiled spring, check that it is not stretched to the point where it does not open the pruner properly. For the blade, check sharpness. For wear points, lubricate with light oil and keep the head free of sap, dirt, or grease.

Cross-reference: LCO Rule 302 number 3 covers the full cleaning procedure: isopropyl alcohol for routine cleaning; Varsol for stubborn contaminants; mild detergent and water; rinse; and towel dry. Fibre-handle pruners are tested every 36 months.

Pole Saw. Used for branches larger than the capacity of a pruner head. Same pole sections as pruner head, and the same 16-ft. caution applies.

Critical: sheath the blade when the saw is not in use. Failure to sheath is an injury risk to workers and members of the public.

Certified Insulated Aerial Devices.

Operating Requirements. Critical: aerial devices shall be operated within: (1), the limitations of the manufacturers' specifications; (2), the current legislation; and (3), the Safe Limits of Approach per EUSR Rule 129.

Dielectric Testing: aerial devices, booms, buckets, and liners shall be dielectrically tested at regular intervals per EUSR Rule 134, or MORE OFTEN if the equipment becomes suspect or if any insulated component is altered, changed, or repaired. All testing must be by a certified laboratory.

Note: Davey Additional Standard. Davey Tree exceeds the EUSR minimum by requiring FRP tools to be tested annually.

Daily Visual Inspection. Critical: aerial devices shall be visually inspected for structural, mechanical, and hydraulic defects, including holding valve checks, each day, prior to use. Inspections shall be documented.

Cross-reference: full holding valve check procedure is in LCO Rule 402. Pass and fail criterion is no observable movement in any part of the check.

Bucket Damage Rule. Critical: a bucket with a hole or fracture must be taken out of service until a bucket replacement or repair to the manufacturer's specifications is completed. No exceptions. A hole means dielectric protection is breached.

The 10-Foot Contact Rule. Critical: do NOT touch, mount, dismount, or allow anyone to contact the vehicle body or chipper if an aerial device is located AT OR NEARER than the Minimum Approach Distance, which is 10 ft., from an energized electrical conductor. When the boom is in proximity, the entire vehicle becomes a potential conductor.

EUSR Rule 123(14), Lower Boom in Proximity. Critical: EUSR Rule 123(14). Aerial devices equipped with a lower boom insert and turret elevator, where the lower boom below the insulated portion is in proximity, shall be adequately grounded.

Cross-reference: this matches LCO Rule 103-N number 13: aerial devices with upper boom insulation only must be adequately grounded, preferably to system neutral, OR isolated with a barricade when raised in proximity to apparatus above 750 V.

Examples of Non-Insulated Tools. Critical: the following are NOT insulated, regardless of how they look. Number 1, chainsaws that are gas-powered. Number 2, gas-powered pole saws. Number 3, hand saws. Number 4, hedge trimmers. Number 5, ropes. Number 6, ladders, unless tested and stickered.

Exam tip: ropes are not insulated, because ropes are semiconductors per LCO Rule 202. Even new, dry nylon rope is not considered insulated for proximity work. Ladders are not insulated by default. Only a fibreglass ladder with a current, legible sticker qualifies. Gas chainsaws cannot be insulated. Only a hydraulic chainsaw on a dielectric pole qualifies for proximity work.

Section VIII key facts to memorize: LOA Authorized Worker column applies to authorized workers and trainees under direct supervision. LOA OHSA Minimum column applies to all non-authorized workers, requiring 3 m, or 10 ft., for any line over 750 V. Insulated tools testing must be by certified laboratory only. If expiry date is not visible, do NOT use the tool and return it for retesting. If a defect is found on inspection, remove from service and return to certified lab. Pole tools in proximity have 3 requirements: insulated plus valid sticker plus insulated rope insert. Hydraulic pole tools have 2 requirements: insulated plus valid sticker. Universal rule is: if it's not tested and stickered, it's not insulated. Hydraulic hose leak check must NEVER be done with bare hands due to pressure intoxification. Hydraulic hoses must be non-conductive. Dielectric pole inspection looks for nicks, gouges, breaks, cracks, contamination, and defects. Pole pruner and pole saw length caution is that 16 ft. or more creates control and injury risk. Pole saw when not in use means blade must be sheathed. Aerial device operating constraints

are manufacturer's specs plus legislation plus LOA per Rule 129. Aerial device dielectric testing is per EUSR Rule 134, more often if suspect or repaired, and must be by a certified lab. Davey FRP tool standard requires annual testing, which exceeds the EUSR minimum. Daily aerial device inspection includes visual plus structural plus mechanical plus hydraulic plus holding valve check, and must be documented. Bucket with hole or fracture is immediately out of service until repaired or replaced. 10-Foot Contact Rule means don't touch vehicle or chipper when boom is within 10 ft. of conductor. EUSR Rule 123(14) states lower boom in proximity must be adequately grounded. Non-insulated tools are the six items of chainsaws; gas-powered pole saws; hand saws; hedge trimmers; ropes; and ladders unless tested and stickered. Ropes are NOT insulated, because they are semiconductors. Ladders are NOT insulated unless tested and stickered.

Section IX, Working in Proximity and DIG.

Section IX is the operational endpoint of the chapter. Sections I through VIII covered the rules, rights, theory, hazards, PPE, and tools. This section answers the final question: with all of that in place, what does the actual work look like, and what do you do when it cannot be performed safely?

Working in Proximity, The Four Pre-Work Rules. Critical: Required conditions for working in proximity. Number 1: an inspection shall be made by a qualified tree worker to determine whether an electrical hazard exists before climbing, otherwise entering, or performing any work in a tree. Number 2: only a Qualified Line Clearance Arborist OR trainee shall be assigned if the electric hazard exists. Number 3: Qualified Line Clearance Arborist trainees shall be under the direct supervision of a qualified Line Clearance Arborist. Number 4: there shall be a second qualified worker within normal, unassisted, voice communication.

Exam tip: "Normal (unassisted) voice communication" means the second worker must be close enough to hear the worker aloft without any aid, no radio, no phone, and no shouting through obstacles. This applies to ALL proximity work aloft.

Cross-reference: this layers on top of the Section VI second-worker triggers of closer than 3 m to conductors over 750 V; can't pre-cut branch; and rigging required. The universal rule here is: second qualified worker within voice range for any proximity work aloft.

De-Energized Lines Are Never 100% Safe. Critical: under all conditions, avoid all direct contact with de-energized electric supply lines since de-energized lines should NEVER be considered 100% electrically safe. Avoid dropping brush or limbs on de-energized electric supply lines, poles, or equipment.

Reasons a "de-energized" line may still carry voltage: backfeed from a homeowner generator, solar inverter, or battery storage stepping up through a transformer to primary voltage; electromagnetic induction, because a long de-energized line running near a high-voltage transmission line can have hundreds of volts induced into it; capacitive coupling from nearby

energized conductors; switching errors, meaning the wrong section was isolated; and stored charge in long cable runs or capacitor banks.

Note: the full DIG procedure, which is De-energize, Isolate, Ground, is the only method that makes a line actually safe to touch. The grounding step specifically addresses backfeed and induction. It shorts out any re-energization attempt before it can reach the worker.

EUSR Rule 130, Items in Direct Contact with Energized Apparatus.

The Prohibition. Critical: EUSR Rule 130. Unless otherwise prescribed by an approved practice or approved work procedure, workers must NOT make contact with any pole, structure, tree, or non-insulated vehicle that is in direct contact with apparatus energized at voltages greater than 750 V. A Pole is dangerous because wooden poles are semiconductors and metal hardware conducts directly. A Structure is dangerous because steel transmission towers and substation framing are highly conductive. A Tree is dangerous because trees are excellent conductors of electricity. A Non-insulated vehicle is dangerous because compromised insulation, or never being insulated, makes it part of the circuit.

The Three Permitted Methods to Clear Items in Direct Contact. Critical: items in direct contact with energized apparatus may ONLY be cleared by: (a) working from an insulated aerial device and using live line techniques; (b) using insulated FRP tools from the ground while wearing rubber gloves; or (c) by de-energizing the electrical apparatus according to the Utility Work Protection Code.

Exam tip: memorize all three permitted methods. Expect a question asking which of the following is NOT a permitted method to clear a tree in direct contact with an energized conductor. Common wrong answers are: climbing the tree; using a hand saw; using a rope; and using a gas chainsaw.

Branches Contacting or Within the LOA. Critical: branches that are contacting exposed, energized conductors or equipment, OR that are within the LOA distances of 10 ft., may be removed ONLY through the use of insulating equipment: a clean and dry fibreglass pole tool while wearing applicable PPE.

Exam tip: two operational requirements that are often tested. "Clean" means surface contamination such as sap, dirt, and salt creates a conductive path along the pole length. "Dry" means a continuous film of moisture conducts current along the surface. A dirty or wet fibreglass pole may have effectively no insulation at all.

Cross-reference: LCO Rule 800 number 6 states pruning near energized conductors requires a dielectrically tested pole pruner with an insulated link insert in the rope that is 215 mm or 8.5 in., and the insulated link must NEVER be bridged. LCO Rule 803 covers limbs already lodged on conductors, requiring insulated pole pruners plus rubber gloves from the bucket of an approved insulated aerial device. If the limb is too large for pruners, or any hazardous situation exists, isolation and de-energization must come first.

DIG, When Proximity Work Cannot Be Performed Safely.

The Trigger: DIG is required when a utility line clearance crew leader, in consultation with the crew, has closely assessed the work assignment and determined that the work cannot be performed safely and in compliance with LOA without the electric supply lines being De-energized, Isolated, and Grounded by the electric utility.

Note: three points. First, the crew leader decides, but in consultation with the crew. Second, both safety AND LOA compliance must be impossible, not just uncomfortable. Third, the utility's line crew performs the DIG, not the arborists.

The DIG Procedure, Six Steps. Critical: DIG equals De-energize, Isolate, Ground.

Step 1: Notify your Supervisor. Step 2: Notify the Controlling Authority. Step 3: Line crew de-energizes and isolates the line, usually by opening switches at BOTH ends of the span to be worked on. Step 4: Line crew installs grounding lines at both ends of the span. Step 5: Line crew tests lines to ensure there is no charge remaining. Step 6: Line crew places a tag on the pole marking it as de-energized, with their signature and contact information. Sometimes the Arborist Crew Leader signs as well. Both give permission before the line can be re-energized.

Exam tip: know the six steps in order. A common test format presents the steps out of sequence and asks you to identify the correct order, or asks "which step comes immediately after the line crew de-energizes the line?" The answer is: install grounding lines at both ends. Why both ends? Isolation opens switches at both ends, which addresses the two-way feed problem. Grounding at both ends shorts out backfeed, induction, or capacitive coupling from either direction.

The Two-Signature Sign-Off. Note: the arborist crew leader's signature on the de-energization tag is the crew's protection against premature re-energization. The line cannot go back into service until both the line crew AND the arborist crew leader give permission. This is a two-key system.

Ongoing Verification. Critical: walk the span at regular intervals to ensure grounding lines are still connected. Grounds can disconnect due to wind, accidental bumping, equipment movement, or animal contact. A ground that was in place at 8:00 AM may not be connected at 2:00 PM.

The Most Important DIG Rule. Critical: if it's not grounded, it's not dead!

This parallels the universal insulated-tools rule. "If it's not tested and stickered, it's not insulated" applies to insulated tools from Section VIII. "If it's not grounded, it's not dead!" applies to de-energized lines in Section IX.

Exam tip: both phrases appear verbatim in the deck and both are virtually certain to appear on the exam. Know them word-for-word.

Working in Proximity, The Final Checklist. Critical: five items required to work in proximity. Number 1: Authorization. Number 2: Knowledge of all appropriate policies, procedures, and regulations. Number 3: Appropriate Personal Protective Equipment, or PPE. Number 4: Appropriate tools and equipment. Number 5: Work according to policies, procedures, and regulations for the work being performed. If any one of these is missing, the work cannot proceed.

Exam tip: expect a "which of the following is NOT required" question. All five items above are required. Memorize them as Authorization, Knowledge, PPE, Tools, and Work per policy.

Personal Preparation and Self-Awareness. You are ultimately responsible for your own safety AND the safety of your co-workers AND the general public. To fulfil that responsibility, there are four practices to follow. Inform your supervisor of anything that might impair your ability to work safely, including illness, fatigue, medication, personal stressors, and vision or hearing changes, meaning anything affecting performance. No matter how routine the job, look beyond the familiar, because each tree is different and each day's conditions are different. Remind yourself of potential hazards, meaning active hazard recognition, not passive assumption. And never be complacent, even if you have done this many times before, because this is the antidote to Conditioned Risk Acceptance Tolerance from Section V.

Cross-reference: the "never be complacent" rule is the operational answer to Conditioned Risk Acceptance Tolerance from Section V. The more often you do something safely, the more comfortable you get, until safety becomes assumed rather than verified.

Section IX key facts to memorize: pre-work inspection must be done by a qualified tree worker. Pre-work inspection must happen before climbing, entering, or performing any work in a tree. If an electrical hazard exists, a Qualified Line Clearance Arborist or trainee under direct supervision must be assigned. Second worker requirement is normal, unassisted, voice communication. De-energized line principle states to NEVER consider a line 100% electrically safe. Brush on de-energized lines should be avoided, meaning don't drop brush on lines, poles, or equipment. Why de-energized does not equal safe includes five causes: backfeed; electromagnetic induction; capacitive coupling; switching errors; and stored charge. EUSR Rule 130 covers pole, structure, tree, and non-insulated vehicle in contact with apparatus over 750 V. EUSR Rule 130 prohibition is that workers must NOT make contact with those items. EUSR Rule 130 three permitted methods are: (a) insulated aerial device plus live line techniques; (b) insulated FRP tools from ground plus rubber gloves; and (c) de-energize per UWPC. Branches in LOA removal method requires a clean and dry fibreglass pole tool plus applicable PPE. "Clean" requirement means contamination creates a conductive path along the pole surface. "Dry" requirement means moisture creates a conductive film along the pole surface. DIG stands for De-energize, Isolate, Ground. DIG is performed by the electric utility's line crew, not arborists. DIG, who decides: the crew leader in consultation with the crew. DIG Step 1 is notify Supervisor. DIG Step 2 is notify Controlling Authority. DIG Step 3 is line crew de-energizes and isolates, opening switches at both ends of the span. DIG Step 4 is line crew installs grounding lines at both ends of span. DIG Step 5 is line crew tests lines for residual charge. DIG Step 6 is line crew tags pole; arborist crew leader may also sign; and both give permission before

re-energization. Why isolation at both ends addresses two-way feed, because both sources must be opened. Why grounding at both ends shorts out backfeed, induction, and capacitive coupling from either direction. Ongoing verification requires walking the span at regular intervals to confirm grounding lines are still connected. Universal grounding rule is: "If it's not grounded, it's not dead!" Working in proximity five-item checklist requires: Authorization; Knowledge; PPE; Tools and equipment; and Work per policies and procedures. Personal responsibility scope covers own safety plus co-workers plus general public.

And that completes Chapter 2, Arborists in Proximity, all nine sections. From the four compliance sources and workplace rights in Sections I and II, through electrical theory and the dangers of shock in Sections III and IV, through hazard recognition, authorization, PPE, and insulated tools in Sections V through VIII, to the operational rules for working in proximity and the DIG procedure in Section IX. Review the key facts at the end of each section regularly, and pay particular attention to the critical callouts, because those are the rules where failure to comply can cause serious injury or death, and they are the most likely to appear on the exam.