

Document title:

**Environmental, Health and Safety  
Supplemental Requirements  
Admin Services – Real Estate and Tele-  
Communications**

Document number:

ADMP-EHS-EHS-00038

Revision No.:

001

Keywords:

Applies to:

Duke Energy

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**PURPOSE**

The purpose of the Environmental, Health and Safety (EHS) Supplemental Requirement document is to define business unit EHS requirements not included in the Duke Energy EHS Handbook. Contractors are to comply with all Federal, State and Local EHS regulations, the Duke Energy EHS Handbook, and these business unit EHS Supplemental Requirements and Contractor-owned programs or procedures.

Contractors shall have on-site the Duke Energy EHS Handbook, the EHS Supplemental Requirement document and/or any Contractor-owned programs or procedures which define work practices exceeding Duke Energy requirements.

Certain sections or specific requirements in this document or the Duke Energy EHS Handbook may not apply depending on the Contractors' scope of work.

**KEYS TO LIFE**

Duke Energy's Health and Safety vision is to have an injury- and illness-free workplace.

Keys to Life support the vision by identifying hazards of high-risk activities known to cause fatalities and serious injuries. They outline standards and define expectations, behaviors and controls necessary to prevent serious events.

Keys to Life do not replace existing safety procedures, policies or manuals. It is one tool of Duke Energy's fatality and serious injury prevention program.

Duke Energy expects Contractors to assess their work scope safety risks to ensure they have effective controls in place and to follow behaviors and standards defined by Keys to Life.

- **Driving Safely** - Wear seat belts, follow posted speed limits and comply with regulations. Avoid distractions that would remove your focus from the road.
- **Pedestrian Safety** – Cross at crosswalks and obey crossing signals. Look for oncoming vehicles and cyclists in all directions.
- **Slips, trips and falls** – Recognize and avoid potential slip, trip and fall hazards, and take appropriate action to mitigate the situation. On stairs, hold handrails where available.
- **Emergency evacuation** – Be familiar with the emergency evacuation procedures for your work location. If you are required to evacuate, immediately exit per emergency evacuation procedures, and escort any visitors with you.
- **Dropped/ Falling Objects** - Implement prevention measures where there is a potential for dropped objects. Measures shall include, at a minimum, proper barriers, exclusion zones and securing/tethering of tools and materials.
- **Hazardous Energy Control (lockout/tagout)** - All sources of hazardous energy shall be properly identified, isolated, verified to have zero energy and tagged/locked prior to starting work. Do not manipulate isolated equipment or work on equipment without authorization.
- **Fall from Elevation** - Utilize fall protection equipment when required by the task. Inspect equipment before use and use it properly. Maintain three points of contact when changing elevation.
- **Confined Space entry** - Enter confined spaces only after the proper evaluation has been performed and appropriate controls have been put in place. Confirm acceptable atmospheric air quality prior to entry with an approved monitor. When required, a qualified attendant shall be present, and an air quality monitor shall be in continuous use.
- **Heavy/industrial equipment** – A worker exclusion zone shall be established around operating equipment, or a designated spotter shall be positioned to oversee safe operation of equipment.
- **Excavation and trenching** – Prior to performing work, all underground utilities shall be positively identified (using underground locating technology) and isolated when warranted. Trenches and excavations that require employee entry shall be properly supported, benched or sloped to protect against cave-in.
- **Workplace violence** – Maintain situational awareness at all times and be alert for signs of violent behavior. Remove yourself if anything appears abnormal or makes you feel uncomfortable and have an escape route planned if you need to leave the area quickly.

**EVENT REPORTING AND INVESTIGATIONS**

1. It is imperative that the Duke Point of Contact (POC) remain abreast of all aspects of contractor performance. Contractors shall verbally notify the POC immediately after any event or near miss. The POC can assist with ensuring the appropriate event response action is taken. When in doubt, notify the Duke POC.
2. Contractors shall report the following events **within 24 hours of the event occurrence** by submitting the “*Injury and Illness Report*” (IIR) form accessible from their Duke Energy contact.
  - a. Occupational Safety and Health Association (OSHA) recordable injuries
  - b. Environmental Events - Reportable Environmental Event (REE) -1, REE-2 and Category 3 environmental event when a notification is made to an external agency.
    - Duke Energy management may request an IIR be submitted for other environmental events to allow EHS evaluation on classification and reporting requirements.
3. The IIR shall be submitted **within two hours** for a Fatality, Life-Altering injury (LAI), or Serious Injury.
4. REE-1's, REE-2's, Fatalities, Life Altering Injuries, Serious Injuries Fatalities (SIF's) and Significant Customer Outage events caused by a contractor will require a causal analysis. The causal analysis investigation will be in accordance with the contractor's procedures but must meet the defined elements of the Duke Energy Corrective Action Program (CAP) (See ADMP-ADM-OPX-00065, Corrective Action Program or the respective Business Unit CAP program).
5. Contractors may be requested to conduct causal analysis investigations on Significant Near Misses based on the discretion of business unit leadership.

**CONTRACTOR COMPANY PRE-QUALIFICATION PROCESS**

1. Pre-qualification is required for Prime Contractor Companies who perform either
  - a. Medium EHS Risk Work with a PO/Contract 1-year or longer, OR
  - b. High EHS risk work.
2. Prime Contractor Companies must register an account with Avetta, which is a 3rd party web-based application pre-approves data and documents submitted by contractor companies. The pre-approval process consists of safety evaluations/ratings and manual audits. Avetta reviews, verifies, documents data submitted by contractors to Duke Energy's Avetta account. A green rated = Approved (passed) Safety Rating is required for DE to issue PO or Contracts.
3. Avetta conducts the safety & environmental evaluation/rating, compares data against Duke Energy and Business Unit specific safety targets, and issues either an Approved (Green/Pass) or Not Approved (Red/Fail) safety rating. (See Targets below)
  - a. Prime Contractor Companies shall review all sub-contractor's environmental, health and safety programs for compliance with environmental, health, and safety requirements, Local, State, Federal requirements, Duke Energy EHS Handbook requirements, and the requirements of this document i.e., EH&S Performance Targets below.
  - b. Manual Audit is the verification by Avetta that contract companies have OSHA compliant written H&S programs. Audits occur every 3 years.
  - c. QuickVett is a module that allows contractors who do not currently participate in Avetta to provide a limited amount of information/safety data to determine if the contractor will meet Duke Energy's safety performance targets should work be awarded. This process does not allow a safety rating to be issued.
4. All targets are 3-year averages except for fatalities, Contractor shall use the following minimum requirements to pre-qualify, provide documentation as requested, and qualify sub-contractor companies:

Contract companies with 1 - 10 employees – all business units:

- a. One or fewer workplace fatalities within the previous three (3) years. If one (1) fatality, no confirmed Serious OSHA citation relating to the fatality.
- b. Experience Modification Rate (EMR) <1.00
- c. Confirmed OSHA Citations <1 serious with 0 willful or repeat Citations
- d. Environmental Notice of Violation (NOV) (federal or state) with penalties > \$100

Companies with 11 but less than 99 employees - all business units

- a. One or fewer workplace fatalities within the previous three (3) years. If one (1) fatality, no confirmed Serious OSHA citation relating to the fatality.
- b. Experience Modification Rating (EMR) = 1.0 or less.
- c. Environmental Notice of Violation (NOV) (federal or state) with penalties greater than \$1000 = one (1) or less confirmed
- d. OSHA citations = one (1) or less serious with 0 willful.
- e. Total Recordable Injuries = three (3) or less.  
**Contractors must pass the fatality target (a) and three of the remaining four targets (b-e).**

Companies with 100 or more employees - all business units

- a. One or fewer workplace fatalities within the previous three (3) years. If one (1) fatality, no confirmed Serious OSHA citation relating to the fatality.
- b. Experience Modification Rating (EMR) = 1.0 or less.
- c. Environmental Notice of Violation (NOV) (federal or state) with penalties greater than \$1000 = two (2) or less confirmed.
- d. OSHA citations = two (2) or less serious with 0 willful.
- e. Total Incident Case Rate (TICR) = Business unit specific Targets. Total Recordable Incident Rate (TRIR) is an equivalent term
- f. Days Away/Restricted Time (DART) = Business Unit Specific Targets  
**Contractors must pass the fatality target (a) and four of the remaining five targets (b-f).**

**HEALTH HAZARD ASSESSMENT (HHA)**

1. An HHA shall be completed for all work in occupied buildings and shall include at a minimum:

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- a. Evaluation of safety and health effects on building occupants relating to the activities being performed
- b. Identification risk of the work
- c. Identification of actions for mitigating the risks
- d. A communication plan and a response plan; and
- e. Identification of thresholds for hazards identified that includes identifying the acceptable level and the actions to be taken when the acceptable level is reached.

**JOB HAZARD ANALYSIS (JHA)**

- 1. Prior to beginning work each day/shift, each work group will complete and review a Job Hazard Analysis (JHA) for each work activity to identify the hazards associated with the work and the hazard mitigation plan. No activity will begin without a JHA.
- 2. The Contractor will own the process and ensure all workers are engaged. The Contractor is accountable for ensuring all workers are familiar with the hazards and mitigation plan associated with their work.
- 3. The JHA will be developed at the site with the crew performing the task.
- 4. If the work scope changes during the day/shift, or additional hazards are identified:
  - a. Work must be stopped and,
  - b. The JHA must be updated to include the changes or additional hazards

**PROJECT EHS PLAN**

- 1. Based on task complexity, risks and work duration, a project Environmental, Health and Safety (EHS) Plan shall be submitted to Duke Energy prior to commencement of work.
- 2. The EHS Plan shall address health and safety hazards that are expected during work activities.
- 3. All subcontractors shall be subject to Contractor's EHS plan.
- 4. When contract work involves working with or generating hexavalent chromium (e.g., welding or torch cutting stainless steel), inorganic arsenic (e.g., welding or torch cutting boiler components with significant scaling or vacuuming of fly ash), beryllium (e.g., blasting abrasives, fly ash), lead, silica dust, man-made vitreous fibers and/or asbestos, the contractor's written exposure control plan shall address control methods (e.g., engineering controls, work practices and respiratory protection) to be implemented.

**SITE EMERGENCY ACTION PLAN (EAP)**

1. Prior to the Pre-construction Meeting, the Contractor will provide a written plan describing how emergencies will be handled, including all of the following:
  - a. Suspended worker rescue
  - b. Rooftop rescue
  - c. Electrocution or shock
  - d. Run over or struck by
  - e. Exposure to hazardous materials or asbestos containing material (ACM)
  - f. Discovery of suspect material that may be ACM or lead
  - g. Interior or Exterior fire
  - h. Illness
  - i. Burns
  - j. Hazardous weather
2. The site assembly point must be identified as a mustering point during site emergency evacuations. Shelter in place emergencies must also be addressed.
3. Notification of a site emergency will be communicated by three long blasts of a horn.
4. All work teams will have a suitable communication device that can call 911 for emergencies, and providing normal routing communications with work supervisors.
5. Immediately upon arrival at the site, all work teams will report in and record their time entering the work site, list their morning and afternoon work locations, list a contact phone number, log out when leaving the work site, and record the time of departure.

**TOWER WORK**

1. All tower work is considered High risk and will require familiarization and use of **Form 3 - Tower work site Pre-job briefing/Job hazard analysis form.**
2. (EHS Job Hazard Analysis) during the Tower work PJB. The work requirement is applicable to other work environments including water tanks and monopoles.
3. Contractors performing elevated work for Duke Energy must participate in Tower Work Safety Training.
4. Contractors may not Sub-Contract tower work without approval from a Telecom Construction manager (see Duke POC for contact).
5. Additional procedures must be submitted to include Fall Protection Plan, Dropped Objects Plan, tower work and Risk Mitigation Plan, Crane Hoisting Plan, Hot Work Permit, and others as may be required to facilitate the work. Submit these plans to the Duke Energy POC (Point of Contact).

**CONFINED SPACE ENTRY**

1. Duke Energy's confined space program shall be followed, unless Duke Energy requires the use of the Contractor's confined space program. Where Duke Energy requires the use of the Contractor's Confined Space Program, such program must be acceptable to Duke Energy, and all such work be performed only on the basis of a contractor-issued and numbered permit. Each Contractor is responsible for air evaluation and monitoring in confined spaces. Monitoring equipment shall be provided by the Contractor, calibrated to manufacturer recommendations and all calibration shall be documented. All employees conducting air monitoring shall have proper, documented training.
2. No more than one permit shall be issued and posted for all work activities performed in a single confined space.

**CRANES AND RIGGING REQUIREMENTS**

1. For work scope involving cranes, rigging and lifting, Contractor shall provide Duke Energy a lift plan subject to the review of Duke Energy.

2. Any lift not listed in section 6 below would be consider a normal lift. Complexity of a normal lift would determine the level of planning. Duke Energy and Contractor will agree to the degree of planning for normal lifts on a “as-needed basis”.
3. Crane operator and signal persons certifications shall be submitted to Duke Energy prior to operating equipment on the site.
4. Contractor shall implement a permit process to coordinate multiple cranes and/or other boom-type equipment (e.g., aerial lift) sharing “air-space.” The permit shall require the review and approval by operators, signal persons, and all involved for affected equipment.
5. All critical lift plans shall be sealed by a Professional Engineer and provided to the Duke Energy representative prior to executing / performing critical lifts.
6. Critical lifts are defined as (1) any lift that utilizes more than one crane, (2) any lift involving a crane-suspended work platform, including personnel baskets, (3) any lift over critical operating and/or process equipment (i.e., necessary for continual operation of the facility), (4) any lift that exceeds 75 percent of the crane’s load chart (5) any lift within 10 feet of energized equipment, (6) any lift within 50 feet of energized power lines, (7) any crane setup / lift on a floating device, such as dock or barge or (8) any lift over an occupied facility or building.
7. Critical lift plans shall include crucial information and address key components of the lift ranging from the method of attachment to the load to any requirements for securing the load before unhooking. In addition, critical lift plans shall address soil bearing conditions and provide a written narrative describing the sequence of the lift with specific steps that explain key components, such as crane setup, proper installation of attachment points, and any temporary securement requirements prior to releasing load.
8. Contractors shall be responsible for obtaining and providing to Duke Energy lift information (e.g., load and material / equipment weight calculations) for materials and equipment from manufacturers that are delivered to the project site. This includes information that is intricate and necessary for safely unloading / loading equipment or materials, including but not limited to, lifting lugs, spreader bars, and center of gravity.
9. Signal persons shall possess a whistle, air-horn, or other audible signaling device to warn of flying loads.
10. All rigging hardware (e.g., shackles, eyebolts, slings, and wire rope) shall be domestically manufactured, unless otherwise approved by Duke Energy.
11. Spreaders or lifting devices shall be certified and sealed by a professional engineer and the capacity shall be marked on the device. This includes design, inspection, and testing per the requirements of ANSI / ASME B30.20.

**LOCATION OF UNDERGROUND UTILITIES**

1. The Contractor shall develop a map of the area where work will take place. The map will show all underground utilities within the working area, include piping, communications, electrical, water, gas, conduit, or any other utilities not visible. Work will not be allowed to start until this map/locate process is completed.
2. Location of underground utilities must be conducted by a competent person.
3. The work area must be marked using a white marker paint boundary area to be excavated then use the appropriate paint as to the approximate location of the scanned underground contact) using a method to demarcate work area boundaries that remains visible for the duration of the project.
4. Soft dig methods will be employed to verify the exact location and depth of the underground utility prior to using mechanized digging, trenching or excavation. For any located linear utility, vacuum excavate (pot hole) every 10 feet of the excavation length and vacuum trench 2 feet on each side of the excavation length and depth at 1/3 intervals.
5. No digging, trenching, excavations, driving of posts or stands or other soil disturbance will be allowed outside of the identified and marked work area

***See Appendix 3 - Soft Soil Excavation Guidelines***

**CONCRETE SCANNING, CORING, CUTTING AND ANCHOR DRILLING**

1. Pre – Coring and Cutting Requirements
  - a. Unless deemed unnecessary by Duke Energy, prior to commencement of construction, the Contractor shall perform a “pre-construction” survey of the concrete, or if Contractor lacks the capability, have a third-party survey the concrete. The survey shall be conducted utilizing ground penetrating radar (GPR) technology appropriate for the material to be scanned using one of the secondary scanning methods in Appendix 1.
2. Identification of Existing Utilities and Tools
  - a. Facility drawings identifying utilities, as-built drawings and/or any known local drawings (consult site management) shall be provided to Contractor and scanning vendor shall be reviewed by them prior to scanning.
  - b. All identified utilities and other obstructions in affected zone shall be highlighted and properly marked on the concrete during the scan.
3. Pre-Drilling Requirements
  - a. Unless deemed unnecessary by Duke Energy, prior to the commencement of shooting anchors or drilling in any building susceptible to the utility hits, the Contractor shall perform a “pre-construction” survey of the concrete, or if Contractor lacks the capability, have a third-party survey the concrete. The survey shall be conducted utilizing ground penetrating radar (GPR) technology appropriate for the material to be scanned using one of the secondary scanning methods in Appendix 1.
  - b. The Contractor will submit the plan for performing the pre-construction survey to the project team prior to performing the work. The plan will include a description of the area to be surveyed (including marked drawings as available) as well as a description of the tools to be used to perform the survey and verification of the most recent calibration to the equipment if applicable.

***See Appendixes 1 and 2: Concrete Scanning, Coring, Cutting, and Anchor Drilling Guidelines***

**TRENCHING & EXCAVATIONS**

1. Prior to commencement of construction, Contractor shall perform a third-party “pre-construction” underground survey, unless otherwise agreed by Duke Energy. The survey shall be conducted utilizing ground penetrating radar technology and shall be conducted for the Contractor’s construction “limits of disturbance.” The completed survey / drawings shall be provided to Duke Energy upon request.
2. Any contractor whose scope includes soil disturbance activities such as driving piles or stakes, digging post holes or trenching and excavation activity shall obtain/develop a Trench and Excavation Permit, subject to Duke Energy review and approval, identifying excavation area, potential hazards and protective measures. The Trench and Excavation permit shall be posted in a visible location at the job site and a copy shall be maintained in the respective excavating equipment. All personnel involved in the trenching and excavation shall be briefed on the permit requirements and the job prior to starting work.
3. Contractor shall provide and maintain above ground identification (3 ft. orange stakes) for high hazard utilities (gas, electricity, fiber optic, pressurized lines) as agreed upon by Duke Energy.
4. Prior to breaking ground, Contractor’s competent person shall establish hold points identifying the excavation corridor. No excavation activity shall take place within the established hold points until the area has been surveyed with an underground locating device. Hold points shall be clearly marked by paint on the ground indicating the presence of a utility.
5. Where utilities are identified, Contractor shall “soft dig” unless otherwise approved by Duke Energy. Mechanical digging shall not take place within 10 feet of the identified utility, unless otherwise approved by Duke Energy.
6. Rigid barricading will be used at areas where a fall hazard is present. Trench and excavation barricades shall be identified with signs and/or warning tags noting the Contractor’s name and contact information.
7. Construction excavation activities that encounter suspected contaminated soils shall be stopped and Duke Energy notified immediately. If an archeological item is encountered, the work shall be stopped and Duke Energy notified immediately.



**CONSTRUCTION WASTE MANAGEMENT AND RECYCLING**

1. ALL construction, demolition, maintenance, and remodeling projects are to comply with Duke Energy's Waste Management and Recycling Program. It is the intent of Duke Real Estate Services Workplace Solutions that projects comply with requirements for LEED Construction Waste Management and Recycling Credit MR2, regardless if the project is LEED certified or not.
2. Contractor shall develop and implement a **Construction Waste Management Plan** per LEED Credit MR2 and submit copy of plan to Duke Energy's Project Manager. The plan shall include:
  - a. A diversion goal (50%, 75%, etc.);
  - b. Identification of relevant construction debris and materials to be diverted;
  - c. Parties responsible for implementing the plan;
  - d. Implementation protocols;
  - e. Identification of Duke approved construction haulers and recyclers;
  - f. A determination whether materials will be sorted on-site or comingled; and
  - g. On-site recycling locations.
3. Contractor shall communicate plan requirements to job-site personnel including Subcontractors.
4. Contractor shall recycle and/or salvage *non-hazardous* construction and demolition debris.
5. Contractor shall track and document all construction waste quantities generated, diverted, and landfilled, indicating the material types and quantities recycled, salvaged, or disposed from the project jobsite.
6. Contractor shall obtain and retain verification records (waste haul receipts, waste management reports, spreadsheets, etc.) and provide copies to Duke Energy. Official weight tickets must be submitted to Duke Energy at the end of the project identifying:
  - a. project name;
  - b. weight of load/s;
  - c. material type/s; and
  - d. if materials were recycled, salvaged, or disposed.
7. Contractor shall calculate quantities and ratio of percentage of debris to be recycled or salvaged and the ratio of amount of waste diverted from landfills or incinerators to total amount of waste generated on-site. If weight not available, use conversion chart per the national Recycling Coalition to convert from volumes.  
<http://www.ecy.wa.gov/programs/swfa/grants/docs/OutcomeMeasureConvSht.pdf>
8. Upon completion of the project **Section 2** of the Waste Management & Recycling Summary Form (**See Form 2**) is required to be filled out with supporting documentation and returned to Duke Energy's Project Manager and Duke Energy's Asset Recovery Coordinator.

**ELECTRICAL SAFETY**

1. Contractor shall have a written Lockout/Tagout Program that addresses all sources of uncontrolled hazardous energy, including but not limited to water, compressed air, steam, and hydraulic energy.
2. All electrical wiring, equipment, electric meters will be considered energized until tested and properly isolated.
3. All electrical service to fans, HVAC units, lights, antennas or electrical receptacles must be properly disconnected and tagged out prior to relocation or service.
4. All 120 VAC extension cords will be protected by a GFI device at the source outlet.
5. No repaired or altered drop cords are allowed on the site.

**Form 1: Energized Electric Work Permit is required to be used by contractors**

**HAZARDOUS WEATHER**

1. A Severe Weather Plan shall identify and explain the systems or devices used to track and monitor approaching storms, effective distances for alerting personnel and suspending work, duties of persons responsible for plan implementation, means of communication for alerting site personnel, and stay times and/or distances before resuming work.
2. Effective distances for work suspension, especially for elevated work and crane activities, shall provide personnel adequate time to stop work, secure items and be inside a safe shelter. At a minimum, effective distances and stay times shall meet or align with those published by a recognized source or creditable organization (e.g., National Oceanic and Atmospheric Administration (NOAA), National Lightning Safety Institute, OSHA, American National Standards Institute (ANSI), Center for Disease Control (CDC) / National Institute for Occupational Safety and Health (NIOSH), federal/state agency)
3. Portable toilets must be anchored or tied to prevent overturning and spillage when high wind conditions can be anticipated.
4. Snow, ice, mud and water shall be removed from equipment and working surfaces when a slip hazard is present, and no work will be allowed to take place until the slip hazard is eliminated.

**CONDITION OF WORKING SURFACES**

1. No access or work will be allowed on any roof surface that is wet, frosted or iced.

**FALL PROTECTION & WALKING AND WORKING SURFACES**

1. Fall protection is required if you are within 15 feet from the edge of more than 6 feet.
2. Any activity requiring fall protection will require a fall protection plan. The fall protection plan must be submitted prior to the Pre-construction Meeting and approved by EHS.

**OPERATION OF EQUIPMENT**

1. The following requirements apply to all skid steers, wheeled or track dozers or loaders, dump trucks, and other similar heavy equipment over 10,000 pounds.
2. Equipment will have a functional back up warning device and seat belt.
3. Unless authorized by Duke Energy, no equipment repairs, or service will be allowed on site. The equipment must be removed from the site for repairs or service.
4. During operations of light/heavy equipment an exclusion safety zone of 50 feet shall be established and identified with barrier tape, orange barrels or another suitable device.
5. No workers except for the spotter will be allowed within the safety exclusion zone until all equipment operations are stopped.
6. A spotter will be assigned to each safety exclusion zone; this person is responsible for control of the exclusion zone and communications with the equipment operator/s.

7. Contractor shall survey all power lines and overhead structures (e.g., bridges, conveyors, and pipe racks or bridges) on site. Contractor shall install warning signs and goal posts at all junctions where travel below energized power lines is required. Goal posts shall be installed a minimum of 20 feet on each side of the power line. Power lines that are low voltage, insulated or greater than 25 feet from ground elevation may be excluded from this requirement with documented Duke Energy approval.

**APPENDIX 1 - CONCRETE SCANNING, CORING AND CUTTING GUIDELINES**

**Two Scans are required for this procedure.**

**Primary Scanning Devices**

**Primary Scan #1** shall be completed using the **GPR equipment**. The operator shall be a competent individual in the field of GPR scanning, competent in interpretation of the visual scan with a minimum of 2 years' experience. If less than 2 years then, a competent person shall oversee the less experienced operator.

1. The utility location devices to be utilized shall be capable of detecting utilities and underground structures both conductively and inductively (i.e., metallic and non-conductive materials).
2. The device used must be for the material it will be scanning. For example, when scanning concrete, the device must be capable of scanning and locating all objects embedded in the concrete. If the concrete is "slab on grade," then the device must be capable of detecting the utilities under the concrete slab; it must be capable of giving the proper depth of concrete and all obstructions in the concrete and any utility under the concrete.
3. GPR Vendor must provide a **report** to include the following information:
  - a) Full report of the scan to include pictures, sketch of the cut area, and description of all utilities, pipes, and voids properly identified along with their depth;
  - b) Survey information to include both the vertical (depth) and horizontal plane / location of the underground utilities and subsurface structures; and
  - c) Concrete to be marked properly with depth of all obstructions, depth of concrete along the scan plane.

**Secondary Scanning Devices - Their use and limitations**

1. **Electromagnetic Testing Equipment** - Excellent for finding live power.
2. **Multi-detector** - Excellent for identifying obstructions for small holes and cores, but not for large areas.
  - a) Indicates approximate embedment depth and type of material.
  - b) Detects ferrous and non-ferrous metal, live cables, plastic pipes and other objects such as wood and cavities.
  - c) Identifies different base materials; universal, concrete, wet concrete, floor heating, drywall, hollow brick.
    - Operating depth of approximately 6 inches.
3. **Alternative Ferroskan systems** – Excellent for identification and verification.
  - a) Scans large areas of concrete quickly and easily.
  - b) Capable of scanning rebar, tendons, metal and plastic conduits, glass-fiber cables, voids and wood in dry concrete structures at an approximate depth of 6 inches.

**Training/Certification Requirement**

1. Training, experience or certification of individual performing scan with GPR shall be provided in the GPR scan report. (Hilti does not require certification but should be competent and trained in the use of the tool.)
2. Current certificate of calibration (GPR); these devices may be self-calibrating.

**Scanning, Cutting, Coring Methods**

1. Contractor/GPR Vendor/Concrete Saw Vendor must submit a plan for cutting concrete. Plan shall include at a minimum:
  - a) Sketch or CAD layout of area to be cut/sawed/cored.
  - b) When practical, pictures of the area to be cut/sawed/cored.

- c) Sawing or scoring procedure to include depth of cuts, cutting method, and concrete removal process.
  - d) Prior to cutting, the Contractor and Concrete Sawing sub must have a pre-sawing brief on the plan prior to performing the work.
  - e) JHA for concrete cutting, coring and sawing must be completed for the job.
  - f) HHA, which includes mitigation of impacts to occupants and for hazards such as silica dust.
  - g) Verification that all utilities have been de-energized or depressurized.
  - h) Proper PPE to protect against electrical hazard shall be worn such as; electrically safe gloves (Class 1) and electrically safe footwear.
2. Area that will require coring or slab cutting shall be marked in accordance with the report from the GPR vendor.
  3. GPR scanning will be in grid format (north-south/east-west and diagonal pattern at 1' increments) inside marked location. Depth of wire mesh will be marked on concrete and when the elevation changes it will be noted on the concrete and in report.
  4. Appropriate Secondary Scan shall be completed prior to any saw cutting or core drilling. The secondary scan will verify the GPR results. If the secondary scan results are different from the GPR scan results, then, the GPR vendor shall perform a second scan. Doing the secondary scan while the GPR vendor is on site minimizes the delay the GPR vendor may have, if a Secondary GPR Scan is required.
  5. Cutting/scoring of concrete will be 1" above identified depth of wire mesh material.
  6. If no wire mesh is identified in the concrete, then the cutting/scoring of the concrete shall be 3" above the depth of the concrete (this is the bottom of the slab).
  7. The equipment used to perform the cutting/scoring of concrete shall have a positive means of depth control.
  8. When performing coring operation, no cores will be allowed above/through any obstructions such as posts, pre-tension cables, or utilities. If rebar is detected, the plan for cutting the concrete requires prior Duke Energy approval.
  9. Pneumatic or electric chiseling tools may be allowed to remove/to breakup concrete so long as any bit used has a blunt or rounded end to minimize damage to conduit or other utilities and to prevent cutting into any wiring.
  10. Hand chiseling shall not be used because it introduces an unacceptable hazard.
  11. All affected personnel shall be informed of the task, its hazards, and the methods to mitigate silica dust generation from this task.

**APPENDIX 2 - CONCRETE ANCHOR DRILLING GUIDELINES**

**Two Scans are required for this procedure.**

**Identification of Existing Obstructions Tools**

1. Facility drawings identifying utilities, as-built drawings and/or any known local drawings (consult site management) provided to the Contractor and scanning vendor shall be reviewed by them prior to scanning.

Primary Scanning Devices

1. GPR Equipment is a Hilti Multi-detector PS 50 (Operating depth 5 7/8"/accuracy +/- 3/8") or comparable device.
2. The utility location devices to be utilized shall be capable of detecting utilities and underground structures both conductively and inductively (i.e., metallic and non-conductive materials).
3. The device used must be for the material it will be scanning. For example, if scanning concrete, then the device must be capable of scanning and locating all objects embedded in the concrete, giving the proper depth of concrete and all obstructions in the concrete.
4. During the performance of the scan all identified utilities and other obstructions in the zone shall be highlighted and properly marked directly on the concrete. The markings must clearly denote the location/orientation and depth of all obstructions found.
5. GPR Vendor must provide a report to include the following information:
  - a. Pictures, sketch of the cut area, and description of all utilities, pipes, and voids properly identified along with their depth; and
  - b. Both the vertical (depth) and horizontal plane / location of the underground utilities and subsurface structures.
6. Concrete must be marked properly with depth of all obstructions, depth of concrete along the scan plane.

Secondary Scanning Devices - Understanding their use and limitations

1. Electromagnetic Testing Equipment - Excellent for finding live power.
2. Multi-detector - Excellent for identifying obstructions for small holes and cores, but not for large areas.
  - a. Indicates approximate embedment depth and type of material.
  - b. Detects ferrous and non-ferrous metal, live cables, plastic pipes and other objects such as wood and cavities.
  - c. Identifies different base materials; universal, concrete, wet concrete, floor heating, drywall, and hollow brick.
  - d. Operating depth of approximately 6 inches.
3. Alternative Ferroskan systems – Excellent for identification and verification.
  - a. Scans large areas of concrete quickly and easily.
  - b. Capable of scanning rebar, tendons, metal and plastic conduits, glass-fiber cables, voids and wood in dry concrete structures at an approximate depth of 6 inches.

Training/Certification Requirement

1. Training, experience or certification (if applicable) of individual performing scan with GPR shall be provided in the GPR scan report. (Hilti does not require certification, but the individual performing the scan should be competent and trained in the use of the tool.)
2. Current certificate of calibration (GPR) must be available; these devices may be self-calibrating.

Scanning, Drilling Method

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1. Contractor/Sub must submit a plan for drilling or shooting anchors into the concrete. The plan at a minimum should describe:
  - a. Method (Drill or Shoot)
  - b. Depth
  - c. Diameter of hole or anchors
  - d. Quantity of hole or anchors
  - e. Method of positive depth control
  - f. Mitigation plan for any special hazards
2. Prior to drilling or shooting anchors, the Contractor and any subs must have a pre-job brief on the work plan.
3. JHA and HHA must be completed for the job.
4. Ensure all identified utilities have been de-energized or depressurized.
5. Proper PPE to protect against electrical hazard shall be worn, such as; electrically safe gloves (Class 1) and electrically safe footwear,
6. Perform task during off hours as needed and never during a storm/emergency event.
7. Contractor must provide oversight of the drilling vendor.
8. Areas that will require drilling or shooting with anchors shall be marked in accordance with the report from the scans.
9. GPR scanning will be in grid format (north-south/east-west and diagonal pattern at 1') inside marked location. Depth of wire mesh, rebar or other identified obstruction will be noted on concrete and when the elevation changes it will be noted on concrete and in report.
10. Appropriate secondary scan shall be completed prior to any drilling or shooting of anchors. The secondary scan will verify the GPR results. If the secondary scan results are different from the GPR scan results, then the GPR vendor should perform a second scan. Doing the secondary scan while the GPR vendor is on site minimizes the delay the GPR vendor may have if a secondary scan is required.
11. Drilling or shooting anchors will be 1" above identified depth of wire mesh, rebar, or other identified obstruction.
12. If no wire mesh is identified in the concrete, then the drilling or shooting anchor depth can be up to 1" above the depth of the concrete scan.
13. The equipment used to perform the drilling of, or shooting of anchors into, concrete shall have a positive means of depth control, meaning that the drilling or anchoring will not be allowed at a depth greater than the engineering specifications allow.
14. Each hole will be vacuumed out after drilling with a vacuum that doesn't allow for concrete dust to become airborne (e.g. HEPA vacuum.)
15. In addition to the worker performing the concrete drilling or anchor shooting, all affected personnel shall be informed of the task and its hazards. Note: The Contractor must perform an exposure assessment and will need to determine the required mitigation methods for addressing dust generated from the task. The mitigation plan may include the need for all affected persons to wear respiratory protection.

**APPENDIX 3 - SOFT SOIL EXCAVATION GUIDELINES**

**Two locates are required for this procedure.**

Required pre-excavation process

1. All design drawings, including as-built drawings shall be reviewed by the Contractor prior to beginning the work.
2. If digging will occur on any right-of-way not controlled by Duke Energy, the Contractor must request any available as-built drawings from the entity controlling the right-of-way.
3. The Contractor will use the drawings to lay out the path the excavation will follow.
4. Contractor shall verify qualifications of excavator operator, including years of experience, training on equipment, safe operation of equipment.
5. The Contractor will use paint to demarcate (a minimum of 10 feet on either side of the centerline) the area that the excavation activates will follow.

Locate #1, Once the excavation path has been clearly demarcated, then the Contractor shall hire a private location company to perform locates within the demarcated area.

Locate #2, upon completion of the first locate, a second locate will need to be performed to verify the first locate. The second locate can be performed by either the same company who performed the initial locate or a second private location company. If the same company is used, it will be required that a different individual perform the second locate utilizing a separate set of location equipment.

1. Utility locator to begin with a thorough review of design drawings and location of utilities shown.
  - a. Complete locate of the all areas that will be crossed 1-2 days in advance of the work taking place.
  - b. Check at soft digs, tracing exposed wires using the induction method (around wires) after these areas have been opened.
  - c. Bring an electrician on board to safely provide the temporary connections at light poles/etc. to complete the conduction method of testing effectively. The electrician needs to open light panels/doors and do a visual inspection/expose wire. Locator can close the door when he is done unless there are connections that need to be removed, with any removals done by the electrician. If door remains open and energized then, an approach boundary must be set up IAW NFPA 70E requirements.
  - d. Continue to use GPR as a secondary locate method to establish more accurate location/depth of utilities.
  - e. De-energize all (identified) electrical lines, if possible, prior to digging.
2. Once locates have been identified, then the Contractor will bring in the excavation contractor.
  - a. The Contractor will have a pre-excavation briefing with the following personal: Duke Energy Project Manager, Duke Energy Safety Representative, Contractor, and Excavation Crew.
  - b. Contractor will provide a copy of all design drawings to the Excavation Crew that will include: demarcated area and utility locate information from scans.
  - c. The pre-excavation meeting will address the excavation process to ensure that the excavation crew and Contractor understand that deviation from the process is not acceptable without first stopping work and developing a new excavation plan.
  - d. If the new excavation plan requires excavation outside of the demarcated area, then both area demarcation and utility location must begin anew.
  - e. Excavation Permit must be completed prior to any soil disturbance.

Excavation process



1. If location markings have faded or are no longer visible then, the utility location process must be repeated before any work may commence.
2. Workers may use mechanized equipment only when it has been confirmed that there are no underground utilities in the excavation site.
3. The following actions are prohibited while using mechanized equipment:
  - a. Performing work over the top of an auger while the auger is in use;
  - b. Contacting the mechanized equipment at any time while excavating; and
  - c. Failing to maintain a safe distance from equipment during operation.
4. When there is the presence of utilities, then:
  - a. Pot holing of locate utilities will be performed by use of soft digging method.
  - b. The pot holing will be performed every 10 feet and 2 feet to each side of utility locate.
  - c. When excavating material, the required bucket type is a "Grading Bucket," unless when conditions do not allow for use of a Grading Bucket, in which case, the "General Bucket" type is acceptable.
  - d. Care must be taken when digging above known utilities.
  - e. If utility depth is known, then dig to a depth 12 inches above utility in 6-inch intervals.
5. Soft digging methods include:
  - a. Water jet techniques
  - b. Vacuum Spade
  - c. Trench probes
  - d. Shovels (Nonmetallic shovels should be used when utilities are present.)
  - e. Spades
  - f. Spoon
  - g. Post-hole diggers

**FORM 1 ENERGIZED ELECTRICAL WORK PERMIT**

**ENERGIZED ELECTRICAL WORK PERMIT**

This permit must be filled out and approved before work on energized equipment can begin.

**Part I: To be completed by the requester**

Job/Work Order Number: \_\_\_\_\_

- (1) Description of circuit/equipment/job location: \_\_\_\_\_
- (2) Description of work to be done: \_\_\_\_\_
- (3) Justification of why the circuit/equipment cannot be de-energized or the work deferred until de-energizing can occur: \_\_\_\_\_

Requestor: Line Business Officer's Signature & Title \_\_\_\_\_

\_\_\_\_\_ Date

**Part II: To be completed by the electrically qualified persons doing the work (use reverse side of this sheet if necessary, for explanations, or attach EHS Scope of Work document for details)**

- (1) Detailed job description procedure to be followed while performing the above work:
- (2) Description of the safe work practices to be followed:
- (3) Results of the Shock Hazard Analysis:
- (4) Determination of the Shock Protection Boundaries:
- (5) Results of the Flash Hazard Analysis:
- (6) Determination of the Flash Protection Boundary:
- (7) Necessary PPE to safely perform the assigned task:
- (8) Means employed to restrict access of unqualified personnel to the work area:
- (9) Evidence of completion of a Job Briefing including discussion of any job-related hazards:
- (10) Do you agree that the above described work can be done safely  Yes  No?  
(If no- return to requestor)

Electrically Qualified Person \_\_\_\_\_

\_\_\_\_\_ Date

**Part III: Approval(s) to perform the work while electrically energized. Two signatures minimum.**

\_\_\_\_\_  
(Print)  
General Manager or Director (Required)

\_\_\_\_\_  
Chief Engineer

\_\_\_\_\_  
(Signature)  
General Manager or Director (Required)

\_\_\_\_\_  
Duke EHS

Customer Representative (e.g., PM) \_\_\_\_\_

\_\_\_\_\_ Date

**FORM 2**

**WASTE MANAGEMENT & RECYCLING SUMMARY FORM**

Identify overall diversion goal (50%, 75%, etc.):							
Material Type	SECTION 1			Handling Procedure, Hauler, or Destination	SECTION 2		
	Identify Materials (X)				Quantity of Each Material by Weight (TONS)		
	Recycle	Salvage	Landfill		Recycled	Salvaged	Landfilled
<b>INERTS</b>							
Asphalt							
Block, Brick, Tile							
Concrete							
Rock, Stone							
Soil, Dirt, Sand							
Other- Define							
<b>SOURCE SEPARATED</b>							
Paper / Cardboard							
Wood - Untreated							
Wood - Treated							
Ferrous Metal (Steel)							
Non-Ferrous (Cu, Al)							
Wire and Cable							
Plastics/PVC							
Landscape Debris							
Acoustical Ceiling Tile							
Carpet							
Other – Define							
<b>SALVAGE - REUSE</b>							
Attach list of Materials or Equipment to be salvaged for re-use.							
<b>DISPOSAL (Landfilled)</b>							
				<b>Totals</b>			
					<b>Percent Recycled</b>		

**If NO Materials are targeted for recycling or salvage, please state why.**

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Contractor Company Name: \_\_\_\_\_

Contractor Representative Name: \_\_\_\_\_ Date: \_\_\_\_\_

Contractor Signature: \_\_\_\_\_

**FORM 3 - TOWER WORK SITE PRE-JOB BRIEFING/JOB HAZARD ANALYSIS FORM.**

*A job hazard analysis (JHA) is required to be completed with the entire crew before beginning work each day.*

<b>Date</b>		<b>Time</b>	
<b>Brief description of project</b>			
<b>Duke Energy Contact</b>		<b>Phone</b>	
<b>Contractor</b>		<b>Phone</b>	
<b>PIC</b>		<b>Phone</b>	
<b>Emergency information</b> Location address/nearest public roadway GPS coordinates (if available)			
Name and Directions to or address for the nearest medical care center (map can be provided)			
Establish 9-1-1 for emergencies-yes or no		Specify location of keys to vehicles	
<b>Check off each item reviewed</b> <ul style="list-style-type: none"> <li>• First aid kit location</li> <li>• Fire extinguisher location</li> <li>• AED <i>if provided</i></li> <li>• Blood borne pathogen kit <i>if provided</i></li> </ul>		<ul style="list-style-type: none"> <li>• Emergency eye wash-face drench</li> <li>• Hand wash</li> <li>• Restroom facilities</li> <li>• Drinking water</li> <li>• Emergency evacuation muster site</li> </ul>	

Use a check, circle, or underline all that apply. Fill in information as required.

- **The person in charge (PIC)** must decide conditions are safe for work.
- **The person in charge (PIC)** shall be considered the site manager.
- **Work Zone**
  - a. Establish the controlled area; authorized access; dropped object avoidance area; if possible, establish a work zone under the tower equal to half the total height, the distance that tools or hardware could fall away from and/or ricochet off the tower.
  - b. Is there pedestrian and public vehicle traffic near the tower?
    - 1. Is signage sufficient warning?
    - 2. Do you have ground monitor/support?
    - 3. Are barriers required?
  - c. Are your signs set up for a sufficient perimeter and can they be seen by anyone near?
  - d. Identify whether your work could affect other workers or activities near the job site. Notify affected personnel as needed.
- **Environmental Hazards**
  - a. **Weather conditions.** Continually monitor local weather stations for watches and warnings.
  - b. **Extreme Heat** and sunlight exposure:
    - 1. Make sure all workers are trained to recognize the signs of heat exhaustion and heat stroke.
    - 2. Drink plenty of water; stay hydrated; take breaks as needed; dress for the conditions.
    - 3. Use sunscreen, sunglasses, and lip balm when working in direct sunlight.
    - 4. Avoid working in the extreme heat; if practicable, rearrange climbing schedule.
  - c. **Extreme Cold:**
    - 1. Make sure all workers are trained to recognize the signs of hypothermia and frostbite. Take breaks as needed.
    - 2. Drink plenty of water; stay hydrated. Warm fluids can provide energy, warmth and replace fluids lost during work.
    - 3. Dress for conditions; determine safe exposure- face and head; dress in layers; avoid excessive sweating.
    - 4. Use hand-warmers, boot-warmers, and/or portable heaters if necessary.
    - 5. Use climbing gloves and consider need for cold weather gloves when not climbing.
    - 6. Have extra dry clothes, gloves, and blankets available at the job site.
    - 7. Sunglasses for reflecting sunlight; use lip balm, sunscreen or petroleum jelly to protect face against wind/sunburn.
  - d. **Slippery conditions; Wet, ice, snow, other**
    - 1. Climbing a wet structure is highly discouraged, as slick conditions are present.
    - 2. Identify mud hazards such as maneuvering when on the ground and mud that can make for hazardous climbing.
    - 3. Take measures to minimize mud at and around the tower base to keep muddy work boots off the tower.
    - 4. Wear “mud boots” to the work site, then change into clean, dry boots in the clean area at the base.
    - 5. Never approach an icy tower. Never climb an icy or snow-covered tower. Additionally, sections of ice may fall to the ground and may be hazardous to people and property.
  - e. **Lightning:**
    - 1. Get off the tower if you hear thunder or see lightning.
    - 2. Stay a reasonable distance away from the tower during lightning or thunderstorms.
    - 3. Maintain continuous communication between all members of the tower and ground crews.
    - 4. Seek shelter inside a vehicle or building, and away from trees, tall structures, and metal equipment during a storm.

**f. Excessive Wind:**

1. Determine means to determine wind speeds- anemometer, Beaufort Wind Scale, other.
2. Avoid climbing towers when wind speeds are approaching or gusting at 25. High winds have the potential to damage yaw and rotor locks, door covers, and other equipment and hardware on the tower.
3. The PIC and crew must determine safe climbing conditions when it is windy.
4. PIC and crew must determine work that can be done safely in windy conditions and the competency and experience level of the climbers should be a major consideration.
5. Take precautions and measures to ensure ropes won't get caught and tangled in the structure or with each other.

**g. Animals and insects**

1. Look out for wasp, bees, spiders, fire ants, snakes, etc.; visually survey before climbing; look where you are grabbing or standing.
2. Stay clear of all birds and nests
3. Check for any biting or stinging insects and animal hazards on the ground.

○ **Communication between crew**

1. Will ground support and climbers have cell phone and/or radio?

○ **Ground support**

1. Determine with climber's emergency action plan:
  - a. Signals for trouble on tower- establish and verify.
  - b. Audible signal for dropped object; consider utilizing whistles.
  - c. Plan for rescue of climber.
  - d. Establish check in from climber and establish breaks.

○ **Working from heights**

1. Are all climbers trained and qualified (certificate of completion)?
2. Determine requirements for PFAS/inspect all climbing gear?
3. Establish the safe path/communicate the climbing plan.
4. No tower climbing is allowed in darkness unless it is identified as an emergency or essential to the operation of the system by the PIC and crew. It would be permitted after there is a hazard assessment and sufficient lighting provided. Examples: rescue operation, imminent danger, storm restoration activities required to work within the maintenance window, etc.

○ **Tools for use while on the tower**

1. Inspect all tools for safe work condition.
2. Use tools and gear fitted with loops or slings so they can be secured with carabineers to the climber, or to the tower.

○ **Material, equipment, lifts, rigging**

1. Lift plan: will a crane be used? If yes, then who is a qualified rigger, signal person? Verify crane operators license-certificate.
2. If a crane is in use fill out lift plan form.
3. Inspect lifting equipment/rigging equipment.

○ **Electrical hazards- determine if energized work permit is required.**

1. Have controlling entities been notified of this project and checked off - transmission, distribution, substation, **ECC?**
2. Identify overhead, underground, adjacent hazards; determine safe work distances- MAD and MEC as needed.
3. Identify extended reach hazards.

Extended reach means working within 5 feet of energized conductors and/or equipment or having a conductive object within five feet of energized conductors and/or equipment.

  - a. Determine distance of energized conductors and/or equipment from the tower structure location.
  - b. Determine the length of any cable ropes, or similar equipment that will be used on the tower.

- c. Determine the height that any cable, ropes, or similar equipment will be used on the tower.
  - d. Determine extended reach boundary.
- 4. LOTO- if utilized, determine requirements; who is in control; what locks or tags are in use.
- **General hazards review**
  - 1. Dropped objects, material, equipment: head and body trauma- all loose objects shall be affixed in safe manner to prevent dropping.
  - 2. Terrain: slips, trips, falls- check pathways; focus on walking when walking.
  - 3. Material handling: utilize proper lifting techniques, lifting equipment, get help as needed.
  - 4. Housekeeping: work site organization, identify trip hazards, and debris.
  - 5. Vehicle and motorized equipment operation: utilize traffic vest, spotters, escorts, 360 checks, low speed operation. Avoid backing situations.
  - 6. Hot work: hot work permit required, fire extinguisher, fire blankets, fire watch.
  - 7. Chemicals: notification, SDS, labeling, storage.
  - 8. RF exposure: use monitors as required to determine hazard level, work procedures, and PPE requirements.
  - 9. Energy control: identify hazardous energy and determine requirements for LOTO/barriers.
- **Human Performance Principles-** pick at least one from each section to review.
  - 1. **Error precursors-pre-existing condition that could lead to an event (undesirable result to an action).**  
 Time pressure/ Distractions/ Complacency/ Lack of knowledge, proficiency/inexperience/ Stress Simultaneous-multiple tasks Changes/Departures from routine/ Lack of procedure/ High workload/ Repetitive tasks/ inaccurate risk perception - Tunnel vision/ lack of big picture.
  - 2. **Tool box- use these as barriers for error precursors.**  
 STAR (stop think act review)/ 3-way communication/ situational awareness, monitor/ self-check/ peer check observations pre-job brief/ job hazard analysis/ procedure use & adherence/ collaborate/ challenge/ If Then/ timeout.