**OREGON OCCUPATIONAL SAFETY AND HEALTH DIVISION**
**DEPARTMENT OF CONSUMER AND BUSINESS SERVICES**

# PROGRAM DIRECTIVE

Program Directive A-303
Issued May 2, 2022
Revised _____

**SUBJECT:** Underground Utility Installations: Inspection and Citation Guidance

**AFFECTED STANDARDS/ DIRECTIVES:**

Division 1, Rules for all Workplaces, OAR 437-001-0760(1)(b)(C)

Division 3/P, Safety Training & Education, 29 CFR 1926.21(b)(2)

Division 3/P, Specific Excavation Requirements, OAR 437-003-0096(2) and 29 CFR 1926.651(b)

Division 3/T, Demolition, 29 CFR 1926.850(c), Preparatory Operations

Oregon OSHA Field Inspection Reference Manual (FIRM)

Program Directive A-176, Excavation Standards.

Program Directive A-265, National Emphasis Program (NEP): Trenching and Excavation.

Program Directive A-290, Inspection and Citation Guidance for Roadway and Highway Work Zones.

Interagency Agreement between the Oregon Public Utility Commission and the Oregon Department of Consumer and Business Services - Occupational Safety and Health Division (Oregon OSHA).

**PURPOSE:** To provide guidance to compliance safety and health officers (CSHOs) on conducting inspections of workplaces involved in construction, maintenance, and utility work activities associated with underground utility installations.

**BACKGROUND:** In May of 2016, Oregon OSHA and Oregon Public Utility Commission (OPUC) entered into an interagency agreement to promote cooperative efforts between the two agencies for outlining the responsibilities and activities to be performed by each agency to investigate complaints or

incidents and associated hazards. While efforts have been made by the OPUC to reduce the number of incidents resulting in underground utility damage, such potentially hazardous events continue to occur. "Specifically, in 2018, there were nearly 1,000 damages and 60 percent resulted in hazardous natural gas leak caused by digging errors," *according to the OPUC Natural Gas Pipeline Safety webpage***.**

Underground utility installations facilitate the movement of materials such as; potable water, sewage, electricity, chemicals, steam, compressed gaseous materials, natural gas, fuels and communications like internet, entertainment or telephone. Underground utility installations are comprised of connected infrastructure such as pipes, valves, pumps, tanks, conductors, accumulators and transformers that can be damaged by work activities when contacted, leading to a release and potential hazardous exposure to employees. While not all released materials are hazardous to exposed employees, some such as certain chemicals, high pressure steam, electricity and fuels like propane or natural gas can be. The top two causes of damage to underground utility installations are insufficient locating practices and inadequate avoidance practices. While most contacts with underground utilities occur during excavation activities, not all contacts are the result of excavation activities.

An excavation is defined in Division 3/P, Excavations, CFR 1926.650 as "any man-made cut cavity, trench, or depression in an earth surface, formed by earth removal." Non-excavation activities that have damaged underground utility installations, resulting in hazardous exposures to employees have included the insertion or driving of wood or metal concrete form stakes, survey marker rods, electrical grounding rods, realtor signs and metal fence posts.

Contacting underground natural gas lines may present explosion and fire hazards in the workplace and surrounding areas. Natural gas is easily ignited by an open flame, static electricity, or sparks from the earthmoving activities or nearby equipment. If a natural gas line is contacted and damaged, gas may leak into the workspace, or accumulate in the excavation and result in an explosion or fire. Striking underground energized power lines may result in serious injuries such as burns, electrical shock, broken bones from falls to same level or lower level or death through electrocution.

**ACTION:** This directive applies to all statewide construction, maintenance, and utility work activities associated with underground utility installations subject to Oregon OSHA jurisdiction.

**INSPECTION GUIDANCE AND CITATION POLICIES:**

This section is in addition to the *Field Inspection Reference Manual (FIRM)* and provides additional compliance inspection guidance and citation policies for work-related events where workers are exposed to the potentially serious hazards associated with contacting underground utility installations. Oregon OSHA considers that it is reasonable for underground utilities to be anticipated along roadways, near developed corridors, and within town and cities.

CSHOs who inspect or respond to complaints, referrals or incidents involving underground utilities must follow the applicable guidance outlined in the *Interagency Agreement between the Oregon Public Utility Commission and the Oregon Department of Consumer and Business Services - Occupational Safety and Health Division (Oregon OSHA).*

Inspections related to underground utilities generally originate from complaints filed by utility owners/operators, media referrals, or referrals from the OPUC who enforce Oregon's electrical and natural gas utilities safety standards under ORS 757. In general:

- OPUC may refer to Oregon OSHA enforcement situations involving worker exposures to hazards and possible violations of workplace safety and health laws or regulations enforced by Oregon OSHA.
- Oregon OSHA may refer to OPUC enforcement and assistance situations involving safety standards and possible violations of laws and regulations enforced by OPUC where public safety is a concern.

Priority of conducting inspections from OPUC referrals should be based on the type of underground installation damaged, when the damage occurred, the possibility of imminent danger to workers, and the availability of agency resources. All referrals will be evaluated; however, not all referrals will result in an inspection.

CSHOs conducting trenching and excavation emphasis inspections under Program Directive A-265, *National Emphasis Program (NEP): Trenching and Excavation,* and Program Directive A-176, *Excavation Standards,* may expand the scope of such inspections if serious safety and health hazards associated with underground utility installations are observed in plain view and/or brought to their attention. CSHOs must follow the guidelines in the FIRM when expanding the scope of any inspection.

**For inspections where the location of damaged underground utility installation(s) is still under control of emergency or law enforcement incident command, identify and coordinate with incident command when their operation and enforcement activities allow.**

**A. Site Safety Precautions:** When activities such as excavating or non-excavation-like activities (e.g. driving/installing electrical grounds) result in damage to underground utilities on or near roadways and highways, where public or site operation vehicular traffic exposes workers to struck-by hazards, CSHOs must follow applicable safety precautions in Program Directive A-290, *Inspection and Citation Guidance for Roadway and Highway Work Zones*.

When inspections and investigations of damaged underground utilities begin, CSHOs must first ensure the site of the incident is safe to enter. Inspection activities of the actual incident site will be delayed until after repairs are completed, due to the potentially serious hazards associated with damaged underground facilities such as fire, explosion, and electrocution. CSHOs will determine if, and contact any, emergency incident command of the site if it is still under their control. CSHOs must coordinate inspection activities to ensure no interference with incident command operation and any fire or law enforcement agency investigation activities. If uncertain, contact a utility owner/operator representative to verify the site is safe to enter.

For a potential release of natural gas, handheld natural gas detectors are most effective, but other indicators may include:

- Dirt, water, or debris blowing from the ground into the air.
- An unusual sound, such as hissing, whistling, or roaring, near a natural gas line.
- Smelling a distinctive sulfur-like odor, which is typically added to natural gas, although some people cannot smell the odor. Note that not all gas is odorized, especially at large industrial sites, and may be impossible to smell.

For potential damage to underground electric utility lines, assume all electrical lines, and the surrounding area around the point of contact (30-foot radius), are energized until a qualified person has determined otherwise or has deenergized the line.

**B. Inspection Activities.** This section provides compliance inspection guidance and discussions of citation policies for requirements and regulatory text which the sample citations provided in the *Field Inspection Reference Manual (FIRM)* may not adequately address. The compliance inspection guidance often includes recommended subject matter that should be addressed and reference to the applicable rule.

CSHOs will need to identify the type of work that was/is being performed, and the associated hazards to determine the most appropriate rules to consider. When conducting inspections of work activities occurring near underground utilities, or at the location(s) where underground utility installations have been damaged, identify and document if the employer responsible for the damage is one or more of the following:

- **Excavator** – the person or employer who is performing the excavation work. Note: Oregon OSHA considers directional boring to be excavation work. See definition of "excavation" in 29 CFR 1926.650 to determine if the person or employer is performing excavation work and therefore an "excavator";

  **Driver/Installer (non-excavation related)** – the person or employer who is inserting or driving materials into the earth surface without creating any excavation in the process. Examples include installing wood or metal concrete form stakes, survey marker rods, electrical grounding rods, realtor signs, shoring piles, or metal fence posts;

- **Operator (utility)** – any person, municipal corporation, political subdivision of the state with control over the underground facilities; or

- **Customer** – the end user of the of the utility.

*Note: When determining if the person or employer engaged in an excavation activity, only use the definition of "excavation" in* 29 CFR *1926.650 and not the Oregon Utility Notification Center's definition under OAR 952-001-0010.*

**C. Work Practice Specific Citation Guidance.** Underground utilities can be damaged as the result of a variety of unsafe work practices. While most will occur as the direct result of excavation work, other non-excavation work practices may also threaten underground utilities such as engaging in demolition work or driving/installing rods or stakes.

In general, the rules cited to address violative conditions associated with underground utility installations are:

- OAR 437-003-0096(2),
- 29 CFR 1926.651(b)(1), (3) & (4),
- 29 CFR 1926.850(c),
- 29 CFR 1926.21(b)(2),

- OAR 437-001-0760(1)(a), and
- OAR 437-001-0760(1)(b)(C).

*Note: The referenced OPUC rules under OAR 437-003-0096(1), "ORS 757.541 through 757.751" have been changed,* ***DO NOT CITE OAR 437-003-0096(1)****.*

**D. Demolition-related Work Practice Citation Guidance.** Demolition is a construction-related activity that can expose employees to serious hazards when the utilities associated with the structure being demolished are not recognized and controlled prior to the start of the demolition. While most utilities related to structures being demolished are above ground and not addressed by this program directive, there will be a zone of transition where some utilities enter the structure from below the earth surface. 29 CFR 1926.850(c) requires that all utilities outside the building line must be shut off, capped, or otherwise controlled before the demolition work begins. In some situations, underground utilities might not be shut off, capped, or otherwise controlled at a safe distance from the structure and therefore may be controlled at the building line, such as at the meter on the side of the structure. When this occurs, those underground utilities immediately beneath or adjacent to the structure may yet still pose a hazard as the energized or pressurized portion of the utility lurks below the meter and underground where demolition activities may still adversely affect them. Additionally, 29 CFR 1926.850(c) requires that in each case, any utility company involved shall be notified in advance.

Citation guidance:

1. When underground utilities are damaged, or could have been damaged, as the result of non-excavation related demolition activities, such as breaking up and removing concrete foundations, consider a citation of 29 CFR 1926.850(c) when the utility companies affected by the demolition work were not notified in advance or the utilities were not capped shut off, capped, or otherwise controlled.

2. When the demolition work also involves excavation activities, such as when digging out foundations or removing the underground utility installations associated with the demolition project, the rules associated with Division 3/P, Specific Excavation Requirements, OAR 437-003-0096(2) and 29 CFR 1926.651(b) shall also be considered.

3. When it is discovered that the employer did not train employee in the recognition of the hazards associated with conducting

demolition work near utilities and the means to avoid those hazards, consider a citation of 29 CFR 1926.21(b)(2).

**E. Driving/Installing (non-excavation related) Work Practice Citation Guidance.** There are many work practices, both construction-related and maintenance-related that threaten underground utilities that do not involve any "excavation" activities in the process. When materials are inserted or driven into the earth surface such as wood or metal concrete form stakes, survey marker rods, electrical grounding rods, realtor signs, shoring piles or metal fence posts without creating any excavation in the process, underground utilities may be contacted, resulting in damage. The contact may immediately expose employees to serious hazards like burns from exploding natural gas or electrical shock. Other contacts, because the utility is underground, may result in a hazard to employees that is delayed, such as when a slow release of natural gas accumulates in nearby open excavations or travels through aggregate material below slabs of concrete to accumulate in the basement of structures like residential homes or businesses nearby.

When underground utilities are damaged, or could have been damaged, as the result of these non-excavation-related activities, consider citing the following: OAR 437-001-0760(1)(b)(C), OAR 437-001-0760(1)(a), and/or 29 CFR 1926.21(b)(2).

Citation guidance:

1. Undamaged utility violations. When an employer did not use reasonable means or methods to identify the presence of underground utilities in the area where materials were to be driven/installed into the ground, and a utility was not damaged, consider a citation of OAR 437-001-0760(1)(b)(C).

   Only consider a citation where evidence suggests that an employee reasonably could have contacted an unidentified hazardous utility. To obtain supporting evidence, CHSOs will consult with the Oregon Public Utility Commission (OPUC) who will evaluate for the presence of a hazardous utility that may have been located reasonably close to the actual area of material driving/installing. When evidence from the OPUC does not indicate that a hazardous utility was reasonably close by, issue a Hazard Letter.

   *Note: CSHOs will contact the OPUC and request a determination about the type and estimated location of any*

*utilities that may have been present in the immediate vicinity of the material being driven/installed. CSHOs will contact the OPUC using the contacts established in the joint memorandum of understanding. All OPUC acquired documentation will be included the inspection file.*

2. Damaged utility violations. When a utility is damaged and an employee was potentially exposed to a serious hazard, and the employer did not use reasonable means or methods to identify the presence of underground utilities in the area where materials were to be driven/installed into the ground, consider a citation of OAR 437-001-0760(1)(b)(C).

   In the variable language, add examples of reasonable means or methods that could have been used to discover and avoid underground utilities such as Oregon OSHA recognized Estimating Method 1 (OUNC Notification Center), Method 2 (Private Locate Company), or Method 3 (Trained, Equipped and Evaluated Staff). These utility estimating methods are discussed under 29 CFR 1926.651(b)(1) in the section for Excavation-related Work Practice Citation Guidance. Additionally, the variable language should provide example of the serious hazards the employees were potentially exposed to.

3. Training deficiency for construction-related activities. When it is discovered that the employer did not train employees in the recognition of the hazards and the means to avoid them in association with driving/installing materials into the ground for construction activities, consider a citation of 29 CFR 1926.21(b)(2).

4. Training deficiency for non-construction-related activities. When it is discovered that the employer did not train employees in the recognition of the hazards and the means to avoid them in association with driving/installing materials into the ground for non-construction activities, consider a citation of OAR 437-001-0760(1)(a).

   Gather evidence that the person installing/driving the materials was authorized to do so by the employer and that the method that they were using to drive the materials was authorized by the employer.

**F. Excavation-related Work Practice Citation Guidance.** The majority of underground utility contacts in Oregon result from opening or extending excavations. To avoid the hazards associated with

contacting underground utilities, an employer engaged in excavation activities must plan appropriately before opening the excavation to identify all utilities, then ensure that employees follow the plan. A utility avoidance excavation plan (not required by rule or otherwise required to be written) includes a series of events established by Oregon OSHA's minimum excavation rules within Division 3, Subdivision P, Excavations that must occur in the following chronological order to endure worker safety:

**Step A1 & A2 –** Before an excavation is opened or otherwise extended beyond the original scope, the employer must give notice of proposed excavation work to the Oregon Utility Notification Center (OUNC). See OAR 952-001-0050 or OAR 860-024-0007 referenced through OAR 437-003-0096(2).

**Step B –** Before an excavation is opened, or otherwise extended beyond the original scope, the employer must determine the absence or presence of all underground utilities, then estimate and mark their general location upon the surface. See 29 CFR 1926.651(b)(1).

**Step C –** Prior to the excavation work approaching an estimated utility location, the employer must determine the precise location of the underground utility within the earth surface whose location was previously estimated and marked upon the surface in Step B. The employer must use sufficiently safe and acceptable means to determine the precise location within the soil column so that the excavation work can be conducted without physically affecting the utility. See 29 CFR 1926.651(b)(3).

**Step D –** Once the excavation is open, all utilities must be protected, supported, or removed to safeguard employees. See 29 CFR 1926.651(b)(4).

This utility avoidance excavation plan, that is not required by rule or otherwise required to be written, may need to be repeated multiple times when conditions at the work site change or as the excavation work progresses.

Example: An employer is hired as a subcontractor to install the storm water system associated with a 90-unit single family residential housing development in a recently re-zoned parcel of wooded land within an incorporated town. The storm water system will be installed after the wooded property has been cleared and the site elevations have been brought to grade but prior to any structures being built, roads being constructed, and sanitary sewer

system or other utilities being installed. The employer follows chronological steps A1/A2, B, C and D noted above in the utility avoidance excavation plan (plan that is not required by rule or otherwise required to be written) and successfully installs the stormwater system without underground utility incident. Approximately four months later, the same employer is hired as a subcontractor to install the final concrete sidewalks throughout the same residential housing development that is now nearly finished. Between the completion of the first job installing the stormwater system and the commencement of the second job installing the sidewalks, other contractors have installed subsurface potable water, sanitary sewer, electrical, telecommunication and natural gas systems. The employer now excavating and driving stakes to install the sidewalks would need to again follow the chronological steps A1/A2, B, C and D to reasonably avoid the new underground utilities that did not previous exist.

**Citation Guidance associated with Step A1, OAR 437-003-0096(2) – <u>Excavator compliance with notification requirements</u> of OAR 952-001-0050**.

This is a prescriptive requirement and not performance based. Under OAR 952-001-0050(1), "*Excavator to Give Notice of Proposed Work; Exemption",* excavators must notify the Oregon Utility Notification Center (OUNC) at least two full business days, but not more than 10 full business days before beginning an excavation, of the date and location of the proposed excavation, and the type of work to be performed.

*Note: OAR 952-001-0050(1) requires the "excavator" to give notice; however, Oregon OSHA requires that the employer of the excavator ensures that notice has been given to the OUNC in accordance with OAR 952-001-0050(1).*

When an employer preparing to engage in excavation activities appropriately provides notice of proposed excavation work to the OUNC, the utility operator in turn is notified by the OUNC. Through this notification of proposed excavation work, the utility operator is then provided the opportunity to place restrictions upon or provide special instructions/precautions about how the excavation activity shall proceed, ultimately protecting employees from hazards associated with damaging underground utilities.

This notification requirement does not apply if the excavation is in response to an emergency, or if <u>all</u> of the following apply, per OAR 952-001-0050(2):

- The excavator is a tenant or an owner of private property;
- The excavation is on private property of that owner or tenant;
- The excavation is less than 12 inches in depth; and
- The excavation is not within an established easement.

Per OAR 952-001-0060, an excavator may provide less than two full business days of prior notice if:

- The excavator is responding to an emergency, and the excavator notifies the Oregon Utility Notification Center (OUNC) immediately, and the excavator takes reasonable care to protect underground facilities;
- The excavator has an agreement with each operator of underground facilities that marks will be provided on a regular basis as the excavator progresses through a project; or
- The excavator discovers an underground facility in an area where the operator of underground facilities had previously indicated there were no facilities.

When the employer engaged in excavation activities does not meet the exemptions under OAR 952-001-0050(2) or 952-001-0060, CSHOs should request any OUNC locate ticket number or the "ticket" the employer is working under.

*Note: CSHOs can go onto Managetickets.com (iSite registration required) to research historical locate ticket information.*

Citation guidance:

1. When an employer properly utilizes the Oregon Utility Notification Center and requests a locate for the area of proposed excavation then waits at least two full business days but not more than 10, the employer shall be considered to have fulfilled the requirements of OAR 437-003-0096(2) "Excavator to Give Notice" as required by OAR 952-001-0050.

2. When the employer is conducting excavation activities and working in compliance with a valid OUNC locate ticket under a general contractor, subcontractor or customer instead of their own, consider issuing the employer a Hazard Letter for not obtaining their own locate ticket.

3. When an employer does not notify the OUNC of proposed excavation work or does not wait at least two full business

days after notifying the OUNC, consider a citation of OAR 437-003-0096(2) "Excavator to Give Notice" as required by OAR 952-001-0050.

Document evidence of the excavator's knowledge of OUNC notification requirements to support any alleged violative condition of OAR 437-003-0096(2), as shown by not complying with OAR 952-001-0050 in the variable language of the citation.

**Citation Guidance associated with Step A2, OAR 437-003-0096(2) – <u>Utility operator or customer compliance with notification requirements</u> of OAR 860-024-0007 to prevent damage to underground facilities by complying with the requirements of OAR chapter 952.**

While OAR 952-001-0050(1) requires excavators to notify the Oregon Utility Notification Center (OUNC) of the date and location of the proposed excavation and the type of work to be performed, utility operators and customers must also do so to be in compliance with OAR 860-024-0007. Notification to the OUNC is a prescriptive requirement and not performance based.

Citations issued to a customer must only be considered when Oregon OSHA has jurisdiction over that customer. A private homeowner who damages an underground natural gas pipe while digging a fence post hole is not under Oregon OSHA's jurisdiction. However, an employer who assigns their employee the task to install or replace a fence at their location, and then the employee contacts and damages an underground natural gas pipe to that establishment, is considered a customer and an employer under Oregon OSHA's jurisdiction. When the employer engaged in excavation activities is also the utility operator or customer, request any OUNC locate ticket number or "ticket" for the excavation activities resulting in the damaged underground installation from the employer.

Citation guidance:

1. When a utility operator or customer does not comply with the requirements of OAR 860-024-0007, consider a citation of OAR 437-003-0096(2) and reference the appropriate OAR violated in the variable language.

*Note: Utility operators and customers can be cited for any utility related violative conditions in OAR Chapter 952, not just those associated with providing notice to the OUNC.*

**Citation Guidance associated with Step B, 29 CFR 1926.651(b)(1) – <u>Compliance with determining the estimated locations</u> of the underground utility installations that may reasonably be encountered during excavation work, prior to opening an excavation.**

The requirement to estimate the location of underground utilities is a performance-based requirement and not prescriptive. Oregon OSHA recognizes three methods for estimating the location of underground utilities; however, only Estimating Method 1 brings the employer into compliance with both Oregon OSHA and the Oregon Public Utility Commission requirements when fully implemented. CSHOs should evaluate and document an employer's efforts to comply with either Estimating Method 1 (Oregon Utility Notification Center), Estimating Method 2 (Private Locate Company), or Estimating Method 3 (Trained, Equipped and Evaluated Staff) for determining the estimated location of utilities as outline in this subsection.

Employers must never start an excavation until the presence or absence of all underground utility installations in the proposed area of excavation have been determined, then for those that are found to be present, their location estimated. Typically, once the presence of subsurface utilities are confirmed and their location estimated, temporary surface markings will be applied to the ground indicating roughly where the underground utilities are anticipated to be below. These temporary markings, that are generally established with spray paint, stakes or flags, do not indicate the precise location or depth of underground utilities and therefore cannot be relied upon for the exact location of underground utilities as required by 29 CFR 1926.651(b)(3). Furthermore, these temporary marking will generally be placed intermittently along the length of the utility and are rarely marked as a solid, continuous line along the entire length of the identified utility through the area of proposed excavation. Employers must use care and reasonable diligence when evaluating the temporary markings to gain a full understanding of how underground utilities interact with the area of proposed excavation work. Beyond OPUC regulation OAR 860-024-0007 that is citable through OAR 437-003-0096(2) which is applicable to "utility operators" and "customers", Oregon OSHA does not have a regulation that specifically states that temporary surface markings must be applied

and maintained. It is Oregon OSHA's position that once temporary markings have been removed or sufficiently disturbed or blocked, the employer engaged in excavation work is no longer in compliance with Step B / 29 CFR 1926.651(b)(1) unless they can demonstrate with specific detail how they continue to know which utilities are present in the area of excavation and how they timely communicate their estimated location(s) to staff that are excavating.

The excavation industry has widely accepted and used temporary markings that conform with the American Public Works Association (APWA) color codes, which include:

- **Red – Electric**
- **Yellow – Gas/Oil**
- **Orange – Communications/CATV**
- **Blue – Potable Water**
- **Purple – Reclaimed Water**
- **Green – Sewer**
- **Pink – Temporary Survey Markings**
- **White – Proposed Excavation (marks placed by excavator to demarcate the proposed area of excavation)**

Each underground facility within the proposed area of excavation should be marked with the appropriate color marker within 24 inches of its outside lateral dimensions. This area is called the "tolerance zone", that includes the 24 inches surrounding the outside dimensions of all sides of an underground facility.

After the completion of either Estimating Method 1, 2 or 3 but before the excavation begins, Oregon OSHA expects that the employer responsible for the excavating will inspect the marked area for clues that would indicate there may be underground utilities within the proposed or actual area of excavation that could have been missed by the entity that conducted either Estimating Method 1, 2 or 3 or that the identification and estimating process is not yet complete.

CSHOs should document any temporary marking by photographing different perspectives of the inspection site and creating a field diagram to illustrate the location of all temporary markings in relation to the exact or approximate location of the utilities when they have been damaged, or could have been damaged. Include street names and addresses, and the approximate locations of any utility clues such as gas meters, communication

boxes, surface or subsurface electrical transformers, water main shutoff valves, overhead powerlines, telephone poles, fire hydrants, etc. When utilities are damaged by equipment such as a track hoe excavator, and the equipment was not moved after the damage occurred, the CSHO should document all markings or utility clues that were visible from the equipment operator's position or ground assistant(s) position at the time leading up to the utility contact.

When the location of a damaged underground utility was missed or otherwise not identified by either Estimating Method 1, 2 or 3, inspect the surrounding area and document any utility clues that could have informed the employer conducting the excavation activities, if they had utilized reasonable diligence, of the existence of the utility in the area. EXAMPLE: Buildings or structures at the location or surrounding areas have visible evidence of utilizing underground utility services (i.e. gas meter, water meter, ground-level electrical transformer, exhaust vent or pipe from gas-fired appliances, etc.).

Often times, in a response to a utility contact and the associated repair by the utility operator, post-damage markings will be applied as the result of an "emergency locate" being conducted. It is important for CSHOs to document in the inspection file which markings were present before the damage occurred and which markings were added after the damage occurred, along with who made the markings and why.

The adequacy of any method an employer uses to determine the estimated locations of underground utility installations, per 29 CFR 1926.651(b)(1), prior to opening an excavation is performance based. CSHOs will document if the employer used any of the three methods outlined below; Estimating Method 1 (Oregon Utility Notification Center), Method 2 (Private Locate Company), or Method 3 (Trained, Equipped and Evaluated Staff) to satisfy the requirement of 29 CFR 1926.651(b)(1) before opening or continuing an excavation.

a) **Estimating Method 1: Oregon Utility Notification Center.** Also known as "Oregon 811", "Call Before You Dig" or "Dig Safely Oregon".

   *Note: Estimating Method 1(OUNC) is Oregon OSHA's preferred way for employers to identify, then estimate the location of underground utilities. It is also a rule*

*requirement enforceable by the Oregon Public Utility Commission.*

The Oregon Utility Notification Center (OUNC) is an information gathering service that identifies utility operators with facilities in areas of proposed excavations, and notifies each utility operator of the proposed excavation. All utility operators are then responsible for locating and marking their facilities within two business days. Most operators will locate to their meter, meter base or to the connection point of the private service.

Once marked, the employer must maintain the accuracy of the original marks. Under the Oregon Public Utility Commission regulations, the excavator is required to submit a new locate request if excavation exceeds 45 calendar days from the date the original ticket was submitted; however, Oregon OSHA requires that employer work under current conditions that are reasonably anticipated which means that new locates may be needed well before 45 calendar days.

> Example: An employer may be starting a trench-type excavation project that is several hundred yards in length and is anticipated to take 28 days to complete. Prior to opening this trench-type excavation, the presence and estimated locations of all subsurface utilities are identified and marked along the entire proposed excavation as the result of the excavator utilizing Estimating Method 1, Method 2, or Method 3. Fourteen days after all utilities along the proposed excavation were identified and their estimated locations marked, another company installs a new underground natural gas pipe across the end of the proposed trench-type excavation project over a weekend using a horizontal boring machine that does not leave either open or obvious physical disturbance evidence. Employees tasked with continuing to excavate the trench as it approaches the end of the project may be placed in danger of damaging this new natural gas utility because they are not working with up-to-date utility locate information even though it was conducted within 45 days of the start of the excavation.

Information normally provided when an employer contacts (calls or uses the online system) the Oregon Utility Notification Center for locates include:

- Name, phone number, company name (if applicable), and mailing address.
- Type or work is being done.
- Who the work is being done for.
- The county and city the work is taking place in.
- The address or the street where the work is taking place.
- Marking instructions, (specific instructions as to where the work is taking place).

Citation Guidance for Estimating Method 1:

1. When an employer properly utilizes the Oregon Utility Notification Center (Method 1), waits the appropriate amount of time for all utilities to be identified and their locations to be estimated/marked, then conducts their own reasonable diligence before opening the excavation to determine if any utilities could have been missed or have not yet been located, the employer shall be considered to have fulfilled the requirements of both OAR 437-003-0096(2) "Excavator to Give Notice" as required by OAR 952-001-0050 as well as 29 CFR 1926.651(b)(1).

2. When an employer did not utilize Method 1, Method 2 or Method 3 to first identify the presence of underground utilities and estimate their general location and the employer opens or extends an excavation that results in damage to a utility that reasonably could have exposed an employee to a serious hazard, consider a citation of 29 CFR 1926.651(b)(1).

3. When an employer did not utilize Method 1, Method 2 or Method 3 to first identify the presence of underground utilities and estimate their general location and the employer opens or extends an excavation that did not result in damage to a utility, consider a citation of 29 CFR 1926.651(b)(1). Only consider a citation where evidence suggests that an employee reasonably could have been exposed to a hazard by contacting an unidentified utility. To

obtain supporting evidence, CHSOs will consult with the Oregon Public Utility Commission (OPUC) who will evaluate for the presence of a hazardous utility that may have been located reasonably close to the actual area of excavation.

*Note: CSHOs will contact the OPUC and request a determination about the type and estimated location of any utilities that may have been present in the immediate vicinity of the material being driven/installed. CSHOs will contact the OPUC using the contacts established in the joint memorandum of understanding. All OPUC acquired documentation will be included the inspection file.*

4. When an employer uses Method 1 but did not first wait the minimum amount of time (two working days) for all the utilities to be estimated/marked, consider a citation of 29 CFR 1926.651(b)(1). Only consider a citation where evidence suggests that an employee reasonably could have been exposed to a hazard by contacting an unidentified utility. To obtain supporting evidence, CHSOs will consult with the Oregon Public Utility Commission (OPUC) who will evaluate for the presence of a hazardous utility that may have been located reasonably close to the actual area of excavation.

   *Note: CSHOs will contact the OPUC and request a determination about the type and estimated location of any utilities that may have been present in the immediate vicinity of the material being driven/installed. CSHOs will contact the OPUC using the contacts established in the joint memorandum of understanding. All OPUC acquired documentation will be included the inspection file.*

**b) Estimating Method 2: Private Locate Company.** An employer, when excavating in Oregon, may use a private locate company to identify and mark the estimated locations of underground installations.

*Note: Estimating Method 1(OUNC) is Oregon OSHA's preferred way for employers to identify, then estimate the location of underground utilities. It is also a rule*

*requirement enforceable by the Oregon Public Utility Commission.*

When Estimating Method 2 is used, CSHOs will document the name and contact information of any and all locate companies used related to the excavation work involved with the underground installation, and the specific types of underground installations they were responsible for locating, estimating and marking.

When an employer chooses to use Estimating Method 2 (and does not use Methods 1 or 3), the employer engaged in the excavation activities is responsible for first determining the capabilities and authorizations of the private locating company for the proposed area of excavation. Generally, a contract will establish which utilities the locating company is equipped and qualified to identify. Not all private locating companies are trained, equipped or qualified to identify, then estimate the location of all types of underground utility installations. Additionally, utility operators may only authorize certain private locate companies to locate their utility infrastructure on their behalf while not authorizing others.

When an employer uses Estimating Method 2 (and does not use Method 1), the excavator will not have fulfilled the prescriptive requirement of OAR 437-003-0096(2) "Excavator to Give Notice" as required by OAR 952-001-0050 or OAR 860-024-0007 without an additional notification to the Oregon Utility Notification Center.

Citation Guidance for Estimating Method 2:

1. When the employer is not a "utility operator" or "customer", consider a citation of OAR 437-003-0096(2) and establish in the variable language the violative condition related to OAR 952-001-0050 when an excavating employer used Method 2 to fulfill the requirement to estimate the location of all underground utilities but did not also provide notice of proposed excavation work to the Oregon Utility Notification Center. See discussion of "Customer" on page 12 of this program directive.

2. When the excavating employer is a "utility operator" or "customer", consider a citation of OAR

437-003-0096(2) and establish in the variable language the violative condition related to OAR 860-024-0007 when the excavating employer used Method 2 to fulfill the requirement to estimate the location of all underground utilities but did not also provide notice of proposed excavation work to the Oregon Utility Notification Center. See discussion of "Customer" on page 12 of this program directive.

3. When a utility was damaged as the result of using a private locating company that the employer did not first establish was qualified to identify the specific utility that was damaged, consider a citation of 29 CFR 1926.651(b)(1).

**c) Estimating Method 3: Trained, Equipped and Evaluated Staff.** An employer, when excavating in Oregon, may trained staff to locate specific types of underground utility installations, and provide them the appropriate locating equipment to do so.

*Note: Estimating Method 1(OUNC) is Oregon OSHA's preferred way for employers to identify, then estimate the location of underground utilities in Oregon. It is also a rule requirement enforceable by the Oregon Public Utility Commission.*

Utilizing employees who can successfully and consistently estimate the location of underground utility installations must be reserved for those that the employer has properly trained, equipped and tested to verify they are qualified in the subject matter and competent to do the work. When used, CSHOs will document the name of those employees who performed the locates, their level of experience to locate underground installations, the locating equipment provided and used, the type of training provided, and the method(s) the employer utilized to verify their competency. Request and review any such training records, certifications and applicable equipment maintenance and calibration records.

Citation Guidance for Estimating Method 3:

1. When the employer is not a "utility operator" or "customer", consider a citation of OAR 437-003-0096(2) and establish in the variable language the

violative condition related to OAR 952-001-0050 when an employer used Method 3 to fulfill the requirement to estimate the location of all underground utilities but did not also provide notice of proposed excavation work to the Oregon Utility Notification Center.

2. When the excavating employer is a "utility operator" or "customer", consider a citation of OAR 437-003-0096(2) and establish in the variable language the violative condition related to OAR 860-024-0007 when the excavating employer used Method 3 to fulfill the requirement to estimate the location of all underground utilities but did not also provide notice of proposed excavation work to the Oregon Utility Notification Center. See discussion of "Customer" on page 12 of this program directive.

3. When a utility was damaged as the result of using staff that was not trained, equipped or evaluated to identify the specific utility that was damaged, consider a citation of 29 CFR 1926.651(b)(1).

**Citation Guidance associated with Step C, 29 CFR 1926.651(b)(3) – <u>Compliance with determining the exact locations</u> of underground installations by safe and acceptable means.**

There have been numerous examples where employers engaged in excavation activities go on to damage utilities that had been previously identified and their locations estimated. Often, these utility contacts result from work practices that include attempting to expose and discover the precise utility location with powered equipment such as excavators or aggressive hand digging as well as assuming the estimated markings were more accurate than they actually were. Furthermore, several damages have occurred after the specific utility locations have been discovered by the potholing methods described below because the precise locations between the potholes were actually not where they were expected to be.

To prevent contact with underground installations that could result in damage and potentially expose employees to serious hazards, employers engaged in excavating activities must use non-invasive methods to determine the specific location of each underground installation as the actual excavation work approaches the estimated utility locations so those utilities. Normally the exact location,

including the depth, of underground utility installations can be determined by “potholing”. Potholing is an investigating method used to carefully excavate small vertical test holes from the surface to a buried utility line to expose and visually verify the specific location and depth. Oregon OSHA regulations do not dictate how frequently or far apart an employer must pothole; It is performance based. There have been many examples of utility installation damages that have occurred as the result of the employer attempting to excavate the portion of utility between two potholes with a powered track hoe excavator that were fifty feet apart. In these examples of damages, a common cause was that the excavator assumed the utility was horizontally level and without fluctuation in depth or containing any irregularities such as capped off “T” fittings from previous service lines that had been disconnected. The excavator operator, working off those assumptions, scrapped soil away at a rate of a few inches pure bucket cycle, snagging the capped off “T” rising above the utility, resulting in damage and a release of natural gas.

Safe and acceptable means used when the excavation approaches the estimated utility location or while potholing to determine the exact location of underground installations include the following methods:

a) **Hand digging.** This method of potholing utilizes hand tools that are used with appropriate investigative caution. Tools, such as shovels and trowels, are typically used to manually uncover and remove material at a cautionary exploratory rate of an inch or two at a time. Constant attention and care need to be taken to prevent damage to utilities during the exploratory potholing process. Non-conductive hand tools and insulated probes are permitted when used with caution. Swinging of pick-axes and use of other tools with great force, including shovels, is not considered a safe and acceptable means of hand digging due to the lack of appropriate caution.

b) **Vacuum excavation.** This method utilizes specialized equipment that uses either high-pressure air or water to break up soil that is then removed from the area through a large, high-velocity, suction hose and is stored in a holding tank. While this can be a safe and acceptable means of potholing, it can also be used for excavating in general.

Citation Guidance:

1. When it is discovered that the employer did not train the employees in the recognition of the hazards associated with unsafe and unacceptable methods of potholing or approaching the estimated utilities and the means necessary to avoid those hazards, consider a citation of 29 CFR 1926.21(b)(2).

2. Consider a citation of 29 CFR 1926.651(b)(3) when an employer damaged a utility whose location had been previously estimated with either Estimating Method 1 (OUNC Notification Center), Method 2 (Private Locate Company) or Method 3 (Trained, Equipped and Evaluated Staff) and safe and acceptable means were not used to prevent contact with the utility.

3. When a utility installation is damaged as the result of potholing that does not employ safe and acceptable techniques, such as when a pickaxe is used with force, consider a citation of 29 CFR 1926.651(b)(3).

**Citation Guidance associated with Step D, 29 CFR 1926.651(b)(4) – <u>Compliance with protecting, supporting and removing underground utility installations</u> to safeguard employees while the excavation is open.**

The opportunity to damage underground facilities that have been uncovered are not limited to employers that are excavating. Exposed utility installations can become damaged when they are undermined, impacted, or otherwise affected by any activities occurring near them. Activities other than actual excavation activities can damage exposed utilities such as when a utility splice involves flame treating the sheathing and the adjacent utility is not protected from the heat. The employer conducting activities that may negatively affect exposed utilities is responsible to ensure that while an excavation containing underground installations is open, safeguards are used as necessary to protect those utilities.

CSHOs should document which underground installations, if any, were not adequately safeguarded by the employer within the excavation where the utilities are located. Methods of safeguarding include:

- **Protecting.** Physical shields or barriers made from material of substantial structural integrity so as to provide

adequate protection from being struck, disturbed, or otherwise damaged by moving/operating equipment, processes, splicing, flame or heat-treating, personnel, etc.

- **Supporting.** Undermined or suspended utility lines must be effectively supported when necessary to prevent collapse under their own weight. This could require placing timber or pipe across the top of the trench, and then tying a rope from the timber or pipe to the utility line to support its weight.

- **Removing.** Only with notification/permission from the utility owner, or by the utility operator's designated qualified personnel.

  Citation Guidance:

  1. When it is discovered that the employer engaged in construction-like activities did not train the employees in the recognition of the hazards associated with not protecting uncovered utility installations and the means to avoid those hazards, consider a citation of 29 CFR 1926.21(b)(2).

  2. When it is discovered that the employer engaged in maintenance-like activities did not train the employees in the recognition of the hazards associated with not protecting uncovered utility installations and the means to avoid those hazards, consider a citation of OAR 437-001-0760(1)(a).

     Gather evidence that the person was authorized to do so by the employer and that the method that they were using was authorized by the employer.

  3. Consider a citation of 29 CFR 1926.651(b)(4) when an employer engaged in construction-like activities damaged a utility whose location was not protected and the employees were potentially exposed to a serious hazard.

**EFFECTIVE DATE:** This directive is effective immediately and will remain in effect until canceled or superseded.

**History:** Issued May 2, 2022