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Ground Disturbance	

BP WIND ENERGY
OPERATIONS POLICIES AND PROCEDURES

GROUND DISTURBANCE

Document Control Details

Ground Disturbance

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1.0 Purpose

1.1 The purpose for the BPWE Ground Disturbance procedure is to establish the minimum requirements for personnel to follow when performing excavation or other ground disturbance activities.

1.2 Excavations and trenches must comply with the procedures and requirements set forth in OSHA's Excavation Standard (29 CFR 1926.650-652), plus any Federal, State, or local government requirements.

2.0 Reference

2.1 The Reference section is used to provide a list of other documents referred to in this procedure.

2.2 American Society for Testing and Materials (ASTM) Standard

2.3 29 CFR 1926.650

2.4 1926 Subpart P App B

2.5 29 CFR, 1926.652

3.0 Scope

3.1 This procedure applies to all ground disturbance activities controlled or directed by BP facilities.

3.2 Each ground disturbance is different and requires individual analysis of the recognized hazards, precautions to be taken and requirements to be followed.

4.0 Responsibilities

Position	Responsibilities
Performing Authority (AE PA)	Responsible for the activity being carried out under the permit. The Performing Authority may be the person carrying out the task or may be supervising a group of people carrying the job. The Performing Authority can be responsible for more than one task at any one time, providing the tasks can be safely managed concurrently. This person is also know as Supervisor, Foreman, etc.
Area Authority (AA)	Verifies that a Hazard Assessment process is in place and is being followed consistently at the site.
Site or Facility Manager (Issuing Authority [IA], PIC)	Confirms proper permit(s) have been completed and implemented by a Competent Person.

5.0 Acronyms and Definitions

Acronyms

Acronym	Definition
AA	Area Authority
AE PA	Alternative Energy Power Americas Business Unit
IA	Issuing Authority
JSEA	Job Safety Environmental Analysis
LO/TO	Lock Out Tag Out
MOC	Management of Change
OSHA	Occupational Safety and Health Administration
PTW	Permit to Work
SIMOPS	Simultaneous Operations

Definitions

Term	Definition
Area Authority (AA)	The custodian of the permitting process. The AA is responsible for the review, maintenance, assignment, and communication of work responsibilities. He or she may also be known as the PIC (Person in Charge) or the Site or Facility Manager (FM).
Authorized Gas Testers	Personnel who test for the presence of flammable vapors, toxic gases, and oxygen as instructed by the Issuing Authority prior to and during work covered by a permit. Authorized Gas Testers shall be trained on the specific monitor in use.
Benching	Shaping the sides of an excavation to form one or more horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
Competent Person	A person capable due to experience and/or education of identifying existing and predictable hazards, soil types in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to personnel and who has authority to take prompt corrective measures to eliminate them.
Confined Space Entry Program	A detailed permitting program designed to confirm safe confined space entry.
Excavation	Any man-made cut, cavity, trench, or depression in an earthen surface that is formed by earth removal.
Hazardous Atmosphere	An atmosphere which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic or otherwise harmful, may cause death, illness or injury.
Line Finder	A device used to locate underground pipelines and utilities.
LO/TO	The placement of a locking device on an energy isolating device to confirm that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed. Each lockout device must have a tag with its own individual number with a description of the lockout, the name of the person who applied it, and the date the lockout was put into effect.
Shoring	A metal, hydraulic, mechanical, or timber system or structure that supports the sides of an excavation and is designed to prevent cave-ins.

Term	Definition
Sloping	Tapering the sides of an excavation. The angle of incline is determined by a variable of factors including soil type, environmental conditions of exposure, and surface load.
Soil Classification System	Classification used by the National Bureau of Standards
Stable Rock	Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.
Thumb Penetration Test	A test used to estimate the unconfined compressive strength of cohesive soils. This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488 - "Standard Recommended Practice for Description of Soils (Visual - Manual Procedure)." This test should be conducted on an undisturbed soil sample, such as a large clump of soil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (e.g., rain or flooding), the classification of the soil must be changed accordingly.
Trenching	Refers to an excavation where the depth is larger than its width that does not exceed a 15 foot width at the bottom.
Type A soil	A cohesive soil with an unconfined compressive strength of 1.5 tons/ft^2 (tsf) or greater; examples are clay, silty clay, sandy clay, clay loam, silty clay loam, sandy clay loam, caliche, and hardpan. (If a soil is fissured, subject to vibration, or previously disturbed, it is not considered Type A.)
Type B Soil	A less-cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf; examples are angular gravel or crushed rock, silt, silt loam, sandy loam, dry rock that is not stable, partly sloped material, and previously disturbed Type A soil that is not considered Type C soil.
Type C Soil	The least-cohesive classification of soil, with an unconfined compressive strength of 0.5 tsf or less; examples are gravel, sand, loamy sand, submerged soils or freely seeping soils, submerged rock that is not as stable, or a layered system.

6.0 Procedure

6.1 General Requirements

A. All excavations shall be conducted in accordance with the rules, regulations, requirements, and guidelines set forth in 29 CFR 1926.650 - 652, the Occupational Safety and Health Administration's Standard on Excavations, Sloping and Benching (1926 Subpart P App B).

B. Excavations greater than four feet in depth in which oxygen deficient or hazardous atmospheres could reasonably be expected to exist shall be treated as confined spaces. Atmospheric testing and a confined space permit must be completed before personnel enter such excavations.

C. A stairway, ladder, ramp or other safe means of egress shall be located in trench

excavations that are four feet or more in depth. A safe means of egress must be within 25 feet of each employee in the excavation.

D. Ladders shall be secured in a manner to prevent movement while in use and shall extend 3 feet over the trench top.

E. An earth ramp may be considered a safe means of egress only if workers are able to walk the ramp in an upright manner when entering or exiting the trench.

F. The edges of all open trenches must be protected from falling items. Excavated soil and equipment must be kept at least two feet from the edge of the trench or have retaining devices to prevent their falling into the trench.

G. All surface encumbrances that create a hazard to personnel shall be removed or supported, as necessary, to safeguard personnel.

H. No personnel shall be permitted underneath loads handled by lifting or digging equipment.

I. Personnel shall not work in excavations in which there is accumulated water or in which water is accumulating, unless adequate precautions have been taken to protect workers against the hazards posed by water accumulation.

J. Additional requirements related to protective system, (e.g., sloping and shoring) are contained in the Alternative Energy Power Americas Business Unit (AE PA) Ground Disturbance Handbook, Excavation Protective Systems Attachment.

K. A pre-job safety meeting, including Job Safety Analysis, Ground Disturbance Permit, and Emergency Response Plan review, will be held before ground disturbance work is performed on the site. Appropriate documentation of such meeting will be kept with the permit.

L. The following topics at a minimum will be discussed, and the meeting minutes with signed attendance list will be recorded and retained on file:

- Review of potential hazards, safe work procedure, and permitting requirements.
- Agreement that mechanical ground disturbance will not occur unless a Competent Person is present at the job site. A Competent Person will determine if there is a need to be present during ground disturbance activities if there are no underground facilities/pipelines in the search or dig zones, or when manual potholing is being done (shovels, or vacuum excavator).
- Mechanical excavation equipment must not be used to dig within 2' (or greater if specified in the crossing agreement) of an underground facility. An equipment spotter must be in place for all excavation within proximity of any underground utility and the 2' no dig zone must be adequately marked. If the attention of the spotter is diverted elsewhere or he/she leaves the site, the excavation operation **SHALL STOP** until his/her return. The spotter shall remain out of the swing radius of the excavation equipment. The spotter shall be in direct vision of the equipment operator at all times during excavation.
- Proper cutback and shoring must be done in accordance with local, state and federal regulations.
- Pick axes can **only** be used following evaluation and approval by a Competent Person.
- All workers have the right and responsibility to 'Stop the Job' when they suspect work procedures or conditions might be unsafe.

- Personal Protective Equipment requirements, including need for use of fire retardant clothing must be discussed and used.
- All accidents, injuries, first aids and near miss incidents must be reported as per the site's incident notification flow procedure immediately.

M. A site-specific Emergency Response Plan must be in place and reviewed at the pre-job meeting. This Emergency Response Plan information must be available at the work site at all times when work is being performed. At a minimum, the Emergency Response Plan must include:

- facility contact names and phone numbers,
- system isolation procedure and isolation valve locations,
- muster area,
- phone numbers for emergency services, and
- directions to the work site.

6.2 **Facility Marking**

A. All pipelines and utilities noted on the plot plan, pipeline map, or drawing that pass within the search zone of an underground facility (25 feet of both sides of the dig zone) shall be located, identified and marked to indicate location and alignment.

B. A Qualified Line Finder, who is familiar with the area or lease and has in his possession a copy of the lease drawing, shall conduct line-locating procedures utilizing available, pipeline maps, or plot plans. The search zone shall be 'walked' (swept) using a 'line finder'.

C. The Search Area will be electronically swept (blind sweep) using four separate 'grid patterns' (e.g., North – South, East – West, NW - SE, and NE – SW) using blind sweep search techniques to confirm maximum detection capabilities. If the blind sweep shows no indications of underground utilities, the work may proceed after completion of all permit requirements. If the blind sweep detects an unknown underground utility, the work may continue only after verifying that the utility is not within the dig zone. This may require utilization of safe exposure methods and reference to other information sources.

D. Lines must be clearly identified and marked within the search zone (25 feet beyond the dig zone in all directions). All lines should be marked at 15' intervals (or less as required for clarity of location).

<u>The following color code is to be used:</u>

Search zone perimeter – White
Electrical – Red
Potable Water – Blue
Drainage/Sewers - Green
Temporary Survey Markings – Pink
Nonpotable Water – Purple
Gas & Oil – Yellow
Communication - Orange

E. Plot plans, facilities/pipeline maps, and drawings must be cross-referenced with the placement of markers prior to mechanical excavation to confirm that there are no apparent inconsistencies. If inconsistencies are noted between the plot plan, facilities/pipeline maps, or drawing and placement of stakes, another line locate must be done to verify correct line location and alignment.

6.3 **Verifying and Exposing Underground Facilities**

A. All underground facilities within two feet of the new facility being installed (or within 10 feet if paralleling the facility) must be hand exposed or vacuum excavated to verify location, line size, and alignment. All underground facilities and utilities, identified at facility crossing shall be exposed.

B. A Management of Change (MOC), including a risk assessment and action plan, is required prior to any variance from the Ground Disturbance Permit requirements or any other requirements of this Practice. Any variation following completion of the MOC must be approved by the Site/Facility Manager, Responsible Director or their designee, and the Technical Authority (TA). Variations that are more stringent than those required in this Practice do not require the TA approval, but local MOC use and approval may still be required.

C. When constructing a line that runs parallel to an existing underground facility, a minimum separation distance of five feet between the lines should be maintained. In circumstances where a five feet distance cannot be maintained (e.g., possibly due to ROW agreements or landowner restrictions), additional precautions must be implemented, (e.g., exposing the original line at shortened intervals to confirm its orientation, depth, and location).

D. A Competent Person shall make daily inspections of excavations prior to the start of the work shift. This person has the authority and responsibility to modify shoring or work methods as necessary to provide greater safety. If evidence of possible cave-ins or slides (such as accumulating water or seepage) is apparent, all work in the excavation shall cease until necessary precautions have been taken to safeguard personnel.

E. Barriers and barricades shall be used as necessary to protect individuals and mobile operating equipment above the excavation.

F. Personnel shall not be allowed in the excavation or trench when power equipment is being used to perform the excavation

Personnel engaged in excavation activities shall adhere to the steps below:

Step	Protocol Instruction
1	Before beginning an excavation, identify and mark utility installations, such as sewer, telephone, fuel, power lines, water lines, pipelines, or any other underground installations.
2	If applicable, contact utility companies and advise of proposed work prior to the start of actual excavation and call state/local agencies such as ‘One Call’ or ‘DIG’, as required.

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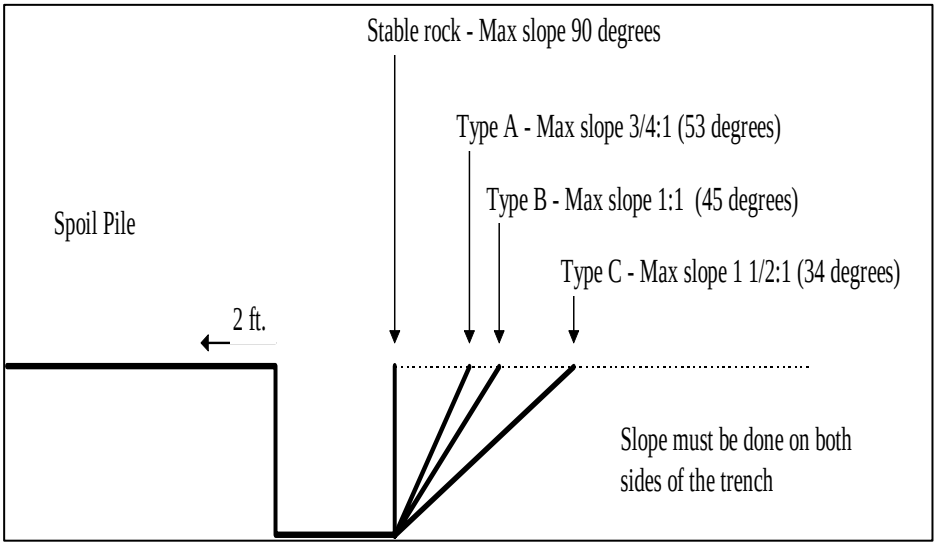
3	After all underground installations have been marked, the BP representative will determine if these installations are within 10 feet of the proposed excavation area, which could create a hazard if contacted by the probing or excavation tools being used.

NOTE: Municipalities or other regulatory agencies may require additional permits.

4	Prepare a Job Safety Environmental Analysis (JSEA) form and conduct a pre-job safety meeting. When underground installations are identified, the area shall be excavated using procedures approved by the Site/Facility Manager.
5	Prepare a Ground Disturbance Permit (see Figure 1 for sample).
6	Confirm that all identified hazards are outlined on the Ground Disturbance permit and JSEA forms.
7	Unprotected electric lines and nonmetallic pipelines should always be isolated, de-energized, and locked out/tagged out prior to beginning any excavation activity.
8	The BP AE representative and the Competent Person will confirm that markings remain in place during digging and excavation operations. Pipeline crossings shall be marked with orange plastic barrier(s) or equivalent. The barriers shall remain in place until that area is ready for excavation.
9	When BP is performing the excavation and trenching, a BP representative and the Competent Person shall be on site if excavation is within 10 feet of any buried utility or other underground installation.
10	The BP representative shall confirm that all appropriate personnel are on site prior to any excavation (examples of appropriate personnel are qualified backhoe operator and spotter).
11	A spotter is required while excavating and trenching where the potential for hitting a line exists. More than one spotter may be required while working around overhead power lines.
12	A moboard/digging bar (a flat piece of metal attached to the teeth of the bucket to prevent the puncture of a pipe) shall be used on backhoe/trackhoe when digging in known proximity of lines.
13	Backhoe operator shall dig parallel to the line. Appropriate training for the equipment operator must be verified.
14	Decide whether to guard the walls by shoring, sloping, benching, or some other equivalent means. Perform sloping or shoring in accordance with Occupational Safety and Health Administration (OSHA) regulations. A registered professional engineer shall design sloping or benching for excavations greater than 20-feet deep.

6.4 **TABLE 1: Maximum Allowable Slopes for Excavations**

Soil or Rock Type	Less than 20 Feet Deep
Stable Rock	Vertical (90°)
Type A Soil	¾ : 1 (53°)
Type B Soil	1 : 1 (45°)
Type C Soil	1½ : 1 (34°)
Mixed Soil Types	1½ : 1 (34°)



NOTE: Numbers shown in parenthesis next to maximum allowable slopes are angles expressed in degrees from horizontal, H = horizontal and V = vertical.

7.0 Training

7.1 **Competent Person:** must receive training per OSHA requirements in excavation safety that enables them to identify excavation hazards in the surroundings, or working conditions that are hazardous to employees/contractors.

7.2 **Employees Working in Area:** prior to beginning ground disturbance activities, the competent person or a facility manager/supervisor must inform the employees/contractors of the hazards associated with ground disturbance work and the requirements of this procedure.

7.3 **Employees Designated to Supervise Contract Activities and Issue Permits:** Awareness level of Ground Disturbance procedure and Permit to Work.

8.0 Attachments

Attachment A: Ground Disturbance Permit

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