

Hanford Site Excavating, Trenching and Shoring

DOE-0344

Revision 0

Effective Date: February 1, 2010

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1.0 PURPOSE

This procedure promotes safe work practices by establishing the minimum requirements and authorizations for working in and around excavations and trenches. It provides for the planning, permitting, administration, execution and completion of **excavation** activities.

2.0 SCOPE

This procedure is applicable to employees performing administration, planning, and field execution of excavation work.

Excavations include any operation in which earth, rock, or other material in the ground (below original grade) is moved, removed or otherwise displaced by means or use of any hand tools, mechanical equipment or explosives.

This procedure is **not** intended to address requirements relating to blind penetration work (concrete core drilling), harvesting, non-mechanical surface cleanup of localized biological contamination, radiological area and other routine soil sampling, replacement of missing/damaged tank dome markers, replacement of fence and sign posts, or other penetrations in original location and at or less than original depth.

NOTE: *The performance of such blind penetration activities may involve hazards similar to traditional excavation work and may require the performance of scope definition, hazard identification, analysis, and mitigation prior to performing work.*

3.0 IMPLEMENTATION

Effective 90 days after publication.

4.0 REQUIREMENTS

All excavation activities performed on the Hanford site shall comply with the requirements of OSHA Regulations in 29 CFR 1926, Subpart P, "Excavations"; 10 CFR 851, "Worker Safety and Health Program"; and [DOE M 450.4-1](#) *Integrated Safety Management System Manual*.

At Hanford, soil is classified as Type C per 29 CFR 1926 Subpart "P." Soil that is considered any other classification must be verified by a Hanford prime contractor's Registered Professional Engineer (RPE) prior to excavation.

5.0 PROCESS

Prior to conducting excavation activities, all requirements applicable to the scope of work shall be reviewed to ensure that appropriate requirements are implemented.

NOTE: *Refer to the Excavation Process Flow Diagram ([Appendix A](#)) for an overview of the process. Definitions used in this process are listed in [Appendix B](#).*

5.1 Preparing for and Performing Emergency Excavation Work

An emergency excavation is any excavation that requires immediate action to prevent or minimize potential of real harm to personnel or property.

NOTE: *Excavation permits are not required when the excavation is determined by the Responsible Person, and approved by management, to be emergency in nature and immediately necessary to ensure worker safety or to protect the environment, site systems, services, or structures.*

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Responsible Person	a.	If performing emergency excavation within an area posted for, or which has the potential to involve radiological hazards, notify the Radiological Control Point of Contact of the sponsoring project or organization. Do this before conducting any walk-down or completing hazards identification.
Facility/ System Owner	b.	Perform a walk-down of the work site, and review any applicable information. Clearly define the scope of work, the hazards, potential environmental impacts, and controls to the workers assigned responsibility for conducting the emergency excavation.
Responsible Person	c.	Analyze hazards for the job as part of the work planning and execution process.
	d.	Notify applicable system/facility and utility owners and/or applicable off-site utility companies directly.
	e.	If the emergency excavation is within 91 meters (100 yards) of a security protected area, then notify the Hanford Patrol Operations Center (373-3800 or 373-3801).
	f.	Notify the Site Excavation Coordinator that an emergency excavation is in progress within 24 hours of beginning work.
Facility/ System Owner	g.	Ensure control of known or expected hazards, then authorize or release the emergency excavation work.
Responsible Person	h.	Conduct the excavation work in accordance with supervisory directions and safe work practices.
Facility/ System Owner	i.	Update configuration documentation for use in future excavations with as-found and as-installed information provided by the Responsible Person or Competent Person.

5.2 Initial Planning for Normal or Routine Excavation Work

Actionee	Step	Action
Responsible Person	a.	Arrange for preparation and submittal of a <i>Request for Cultural and/or Ecological Resources Review for the Hanford Site</i> , Site Form (RL-665 or equivalent). Initiate this request as far in advance as practical to allow for seasonal or biological activity considerations.
		<p>NOTE: <i>The Hanford Tank Farms have received an exclusion from Cultural Resources Review requirements. The exclusion covers new construction and maintenance within the 18 fenced tank farms and within 150 meters (~492 feet) of those areas. It also excludes modifying, adding, or removing mobile trailers in those areas. The exclusion does not include removing existing tanks, or modification or demolition of permanent structures (buildings, water towers, etc.).</i></p>
	b.	Consult with the facility environmental reviewer to determine what environmental documentation is required for the proposed excavation by completing an <i>Environmental Activity Screening form</i> (refer to applicable company procedures).
	c.	Consult with a qualified Radiological Work Screener or owning project/activity Radiological Work Planner/Engineer to determine the appropriate radiological controls required for the proposed excavation work.
	d.	Determine proximity of the excavation to existing waste sites by contacting the Environmental Information Systems group (call 375-WIDS), the Stewardship Information System (SIS), or by querying the Qmap tool on the Hanford Intranet (www.rl.gov/qmap). Contacting the facility Environmental Compliance Officer (ECO) or delegate for assistance may be helpful.
	e.	Determine if the intended excavation work is conducted within 20 feet of existing groundwater wells to avoid causing damage and the potential for regulatory non-compliance issues; consult with the applicable ECO or the Groundwater/Vadose Zone group (376-5660 or 373-3994) for guidance on controlling work near these wells.
	f.	Request a geophysical evaluation/scan. Provide survey or scanning organization with a copy of the composite sketch to aid in locating existing utilities. Request refreshed ground markings during excavation activities, as required.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Geophysical Evaluation/ Scanning Services	g.	<p>Scan area to be excavated, identify and mark underground obstructions on the ground and on paper, or electronically as requested by the project to be included in the work package.</p> <p>Geophysical evaluation or scanning information must be made available to workers at the excavation site for reference use, and are a part of the applicable work package. Use appropriate ground marking color codes specified by the American Public Works Association (APWA 1997). The use of an alternative color code system is permissible only if clearly noted on the scan report (Refer to Appendix E).</p> <p>Written justification for not requiring a geophysical evaluation/scan must be approved by the Facility/System Owner, or Technical Representative, or as required by your company and Safety Representative. The approved document must be included in the job hazard analysis or the work package.</p> <p>Examples of ground scan exemptions may include: a) characterization or stabilization activities on known radiation waste sites (such as ponds, cribs, ditches), b) the 600 Area where no underground lines exist.</p>
Responsible Person	h.	<p>Identify the need for an excavation permit. (See Excavation Process Flow, Appendix A, for information to aid in this identification.)</p>

5.3 Excavation Permit Preparation

1. An excavation permit is required for all excavations **except** the following:
 - Hand digging or vacuum excavation that is outside of culturally sensitive areas **and** less than 305 mm (12 inches) deep.
 - Annual cutting and maintenance of firebreaks authorized by the Hanford Fire Department (HFD), except when performed inside protected areas. This authorization shall be in accordance with annual pre-fire planning conducted between Pacific Northwest National Laboratory (PNNL) and the HFD.
 - Leased and permitted land, easements, and right-of-ways on the Hanford Site that are under the control of state agencies, private companies or public utilities unless directed to do so by the U. S. Department of Energy (DOE).
 - Excavation is determined to be an emergency in nature (see [Section 5.1](#) for a more detailed explanation).

2. Excavation Permit Waiver:

Occasionally, it may be appropriate to request a waiver from the excavation permit process for excavations in areas that have been controlled by a single project. A geophysical evaluation/scan and engineering drawing research of the excavation area shall be done prior to requesting a waiver.

Written justification for not requiring an excavation permit must be approved by the Facility/System Owner, or Technical Representative, or as required by your company. The approved document must be included in the job hazard analysis or the work package.

Examples of waivers previously granted include:

- Tilling of soil for revegetation purposes
- Maintenance of roads, ditches, laydown areas, and parking lots that do not change the original grade or drainage
- Machine excavations within tank farm fences that include a hazard evaluation signed by a Level 1 Manager

3. Initiating the excavation permit

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Company Excavation Coordinator	a.	Provide interface between Site Excavation Coordinator and company personnel involved with work covered by this procedure.
	b.	Provide advice to Responsible Person on need to obtain excavation permit.
	c.	Provide direction to originating person on how to fill out and obtain approvals on the excavation permit or perform these responsibilities.
Permit Originator/ Responsible Person	d.	Initiate preparation of the <i>Hanford Site Excavation Permit</i> (see Appendix C and Site Form A-7400-373) and an associated work package as required by the work control process. Call the Hanford Site Excavation Coordinator (see Hanford Site Excavation Safety Program Web Site for contact information) and request the <i>Hanford Site Excavation Permit</i> number.
	e.	Obtain or prepare a composite sketch (or line-crossing list with facility drawings) of the intended excavation area, including excavation boundaries, identifying existing buried utilities/systems within a given area. Identify the location and ownership of utilities (e.g., electrical, water, sewer, etc.), Waste Information Data System (WIDS) sites, or other underground installations that may be encountered during excavation work.
Site Excavation Coordinator	f.	Log and issue the <i>Hanford Site Excavation Permit</i> number.

4. Confirming the accuracy of permit data, drawing research, subsurface interferences, and obtaining review concurrence.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Responsible Person	a.	Notify utilities owners of intent to perform excavation activities. Provide utilities owners with a composite sketch of excavation area and request identification of utility lines in area of excavation.
	b.	Ensure proper identification of underground objects within area of jurisdiction on the composite sketch.
	c.	Ensure that a qualified Radiological Work Screener or owning project/activity Radiological Work Planner/Engineer screens the excavation work scope to ensure that the appropriate radiological controls are implemented for the known or potential radiological hazards. (Refer to your applicable Radiological Control practices).
	d.	Perform a physical walk-down of the excavation area, involving appropriate excavation work team and utility personnel as necessary. Observe work area conditions, completed scan interference markings, status of nearby systems, other job coordination, or interface issues.
	e.	Ensure that a job hazard analysis of the excavation work scope and all associated activities is in development.
	f.	Obtain applicable Hanford Site Excavation Permit signatures for review/concurrence (Permit Blocks 10 through 23), as explained in the <i>Hanford Site Excavation Permit</i> form instructions and detailed in Appendices C and D . <i>NOTE: Additional signatures may be necessary or required by results from hazard analysis and controls information, or as directed by the Site Excavation Coordinator or Company Interpretive Authority. Hanford Site Excavation Permit signatures confirm that reviews of composite maps, excavation permit data, hazard controls, and other work documents/permits reflect acceptable conditions and that the work can be completed safely in consideration of their respective discipline or area of expertise.</i>
	g.	When excavation depth exceeds 20 feet, obtain Hanford Site Excavation Permit signature from a Registered Professional Engineer (RPE) to ensure proper protective systems are designed/installed. <i>NOTE: 29 CFR 1926.652 (Appendices A, D, and E), manufacturer specifications, other tabulated data, or design approved by an RPE are used for shoring or shielding support systems.</i>
	h.	Ensure to properly identify and contact the appropriate site, building, facility or waste site owners of known or suspected underground interferences (structures and utilities). Verify ownership with appropriate site utilities or manager of nearby facilities.

Actionee	Step	Action
		<p>NOTE: Give consideration to the possibility of tie-ins to/from adjacent buildings or areas. Ownership of buried utility lines may be the responsibility of either Site Utilities or of nearby affected facilities.</p>
Permit Reviewers	i.	Incorporate all review comments onto Hanford Site Excavation Permit form (Block 8) or include as attachments.
	j.	Review all historical and current configuration documentation for area of discipline expertise in relation to the geographical location being excavated.
	k.	Verify that reference documents and drawing numbers are properly noted on the Hanford Site Excavation Permit and attached as appropriate.
	l.	Verify that location of items on composite sketch matches information provided to the Responsible Person and/or ground scan/field walk-down information.
	m.	If needed, inspect the proposed excavation job site to physically review and confirm field locations of interferences, markings, and hazard controls to ensure they coincide with configuration documentation.
	n.	Indicate on the permit any special controls, requirements, prerequisites, etc., including notification points-of-contact with phone numbers, as appropriate. Sign and date excavation permit form in the appropriate block.
Permit Originator/ Responsible Person	o.	Assist the Responsible Person or the scanning organization, as necessary, to locate and visibly mark the underground structures within your discipline, area of expertise or jurisdiction.
	p.	Assist the Responsible Person in resolution of conflicts between as-located items and configuration documentation, as well as conflicts of ownership for system status.
Facility/ System Owner or Responsible Person	q.	Contact required <i>Hanford Site Excavation Permit</i> reviewers for final reviews and signatures if (1) changes to the excavation permit will expand the scope of work or excavation dimensions, or (2) changes or corrections to the work site may affect their previous reviews or instructions.
	r.	Ensure that a Competent Person has been assigned to the excavation activity, as applicable.
	s.	Perform the final review and concurrence for the Hanford Site Excavation Permit in signature Block 23, assuring that the <i>Hanford Site Excavation Permit</i> has been completed satisfactorily and that safe work is achievable.
		<p>NOTE: For excavation work not originated or owned by a Facility, the Responsible Person or designee of the project or organization sponsoring the excavation signs this block.</p>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Responsible Person	t.	<p>In the upper right corner of the <i>Hanford Site Excavation Permit</i>, enter the “Latest Start Date.” If the excavation does not begin by the “Latest Start Date,” obtain a review and concurrence from the facility/system owner and any affected utilities, to verify that no configuration changes have been made, prior to beginning work. Their re-signing and re-dating their blocks on the first page will document concurrence.</p> <p>NOTE: <i>This date should be no more than 90 calendar days from the date of the last signature. The 90-day time limit ensures the most current information is used when releasing the work.</i></p> <p>If the activity was started but was stopped/delayed for more than 90 days, obtain a review and concurrence from the facility/system owner and any affected utilities prior to resuming work. This review is not required for long term projects that have clearly maintained control of their work area. Long term projects that extend beyond 12 months shall have the project Responsible Person review the excavation permit annually, and revise as necessary. The review and excavation permit form shall document any scope changes or support utilities added during the activity. Their re-signing and re-dating their blocks on the first page will document concurrence.</p>
	u.	<p>Ensure a copy of the completed excavation permit is provided to the Site Excavation Coordinator and any company document control service if required by the individual contractor’s procedures.</p>

5.4 Performing Excavation Work

1. Confirming readiness to work.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Responsible Person	a.	<p>Review the work package (as defined in Appendix B) to ensure compliance with specified construction windows, time limits, or operating schedules as applicable.</p> <p>NOTE: <i>For example, some biological/ecological reviews are only good for a certain number of months and must be redone. There may also be time frames specified during which excavation cannot be performed due to the presence of interim/temporary biological concerns or issues.</i></p>
	b.	<p>Ensure the work package correctly identifies the excavation work scope as defined in the Hanford Site Excavation Permit.</p>
	c.	<p>Contact the free public Underground Utility Locate 1-800-424-5555 or through the web site (http://www.callbeforeyoudig.org) a minimum of two (2) workdays before excavation begins to allow the telecommunication cable company, Benton PUD, and natural gas company to locate lines and explain any underground interferences.</p>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
		Provide the following information to the person answering the 1-800 call: <ol style="list-style-type: none"> 1. The requested information is for the Hanford Site. 2. The excavation will be in the _____ Area (200 West, 200 East, etc.). 3. The closest permanent landmark/structure is (crossroads, buildings, Tank Farm, etc.; DO NOT use mobile offices or trailers). 4. Provide survey coordinates, if possible. Reference the location of the excavation to the <i>Township, Range, Section, (and quarter)</i>. 5. Record the assigned service request number on the excavation permit form. <p>NOTE: <i>This requirement may have been fulfilled previously as part of 5.3.2.a and 5.3.2.i, above. Repeat only if it has been more than 10 days or there has been new construction since the previous U-dig inspection. NOTE: This notification is required for both on and off Hanford Site excavation activities. This information is available from the Site Excavation Coordinator (phone number available on site excavation web page) when obtaining the Hanford Site Excavation Permit number.</i></p> <ol style="list-style-type: none"> d. Notify affected onsite organizations a minimum of 24 hours before excavation begins, (e.g., facility/system owners, emergency services, and building occupants). e. Verify that completed scan ground markings remain visible. If markings have diminished or are not visible, request scanning services reapply ground markings. f. Erect excavation warning systems, such as barricades, signs, etc.

2. Releasing excavation work.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Facility/ System Owner or Responsible Manager	a.	Physically review the Hanford Site Excavation Permit , ground scan data and field markings (such as "locates").
	b.	Establish expectations for maintaining excavation area and interference markings.
	c.	Ensure the facility/system is in proper configuration to support excavation safety, including lockout and tagout requirements.
	d.	Authorize or release excavation work through formal work control processes, only after ensuring requirements for safe and environmentally protective boundaries are established.

3. Beginning excavation work and establishing protective systems.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>									
Responsible Person	a.	Ensure any required locks and tags are in place and underground hazardous energy sources (e.g., electrical, mechanical, chemical) are physically verified as isolated and controlled (e.g., safe to work check). Refer to DOE-0336, <i>Lockout/Tagout</i> . NOTE: <i>All excavations that have the potential for radiological hazards are to be properly controlled to ensure worker protection.</i>									
	b.	Ensure that the building or facility operations work release has been provided to proceed with the excavation.									
	c.	Ensure that the assigned Competent Person is involved with the excavation activity, as required.									
	d.	Conduct a pre-job meeting to assure that affected excavation workers, including mechanical equipment operators, are briefed on all requirements and special conditions in the excavation area. Discuss shoring and other protective systems.									
Competent Person	e.	Implement the requirements of this procedure and the requirements of 29 CFR 1926 Subpart P (Excavations). Be able to recognize and abate potential hazards associated with the excavation. Halt any operation in the event of an emergency, or to correct unsafe work practices, or to initiate corrective action(s).									
	f.	Conduct daily excavation area inspections in active excavation areas and maintain inspection logs. Daily inspections are not needed in areas where excavation will not be occurring that day (areas within the excavation permit that are on hold waiting for sample results, etc., and when no personnel are accessing the area). Increase frequency when conditions change due to rainstorms or other hazard-creating conditions. NOTE: <i>The Daily Excavation/Trenches Safety Inspection Log (Site Form A-6001-937-or equivalent) may be used.</i>									
	g.	Determine and direct the installation of protective system methods (benching, sloping, shoring, and shielding) where the excavation depth is planned to exceed 5 feet or if the potential for cave-in otherwise exists.									
Responsible Person	h.	Contact Electrical Utilities, to perform a site visit if the excavation work will be performed within 20 feet of overhead power lines. Based on the site visit, ensure to exercise controls for any potential exposure of excavating machinery to energized overhead power lines. Evaluate any unplanned damages, injury, releases, etc., for input to the reporting of occurrences. NOTE: <i>Safe working distances from overhead power lines:</i> <table style="margin-left: 40px;"> <tr> <td>0 to</td> <td>50 kV</td> <td>10 feet</td> </tr> <tr> <td>Over</td> <td>50 to 200 kV</td> <td>15 feet</td> </tr> <tr> <td>Over</td> <td>200 to 350 kV</td> <td>20 feet</td> </tr> </table>	0 to	50 kV	10 feet	Over	50 to 200 kV	15 feet	Over	200 to 350 kV	20 feet
	0 to	50 kV	10 feet								
Over	50 to 200 kV	15 feet									
Over	200 to 350 kV	20 feet									
i.	Contact the BPA liaison for excavation within 50 feet of BPA power lines. Go to the web site for contact information.										

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
	j.	Place barriers and signs at excavation openings to prevent exposure to co-located personnel and passersby, and ensure that wells, pits and shafts are barricaded (at a minimum of 6 feet back from the edge) or covered.
	k.	Ensure fall protection (barricades, guardrails, etc.) is provided when employees are exposed to a fall hazard that is 6 feet or greater. Fall protection is not needed for excavations with a slope of 1.5/1 or greater.
	l.	Request the performance of radiological surveys and monitoring of soils or other materials, including potentially contaminated piping exposed by excavation, as required by the excavation permit, Radiological Work Permit, or work instructions. <ol style="list-style-type: none"> 1. On the Radiological Risk Assessment Checklist submitted by the Radiological Engineer, or if not provided in the excavation permit, 2. On the risks associated with known or suspected radiological hazards to be encountered.
	m.	Establish and implement safe work practices before entry is made into an excavation that has been determined to be a confined space.
	n.	Address expectations for maintaining markings in appropriate controlling documents such as work packages, specific contract language in construction specifications, etc.
	o.	Comply with the following measures to prevent accidental damage or disturbance of utility or underground obstruction when machine excavating . <ol style="list-style-type: none"> 1. Ensure the review of scan data including facility drawings and underground obstructions identified and evaluated for protective measures. 2. Use only hand digging, vacuum guzzler, or other non-mechanical means within 5 feet of suspected transfer lines. 3. Prior to commencing machine excavation where subsurface obstructions are anticipated or identified on a subsurface scan/geophysical evaluation report, use a non-mechanical potholing technique to locate and expose the obstruction. For this application, a vacuum guzzler or hand digging may be used. Use of picks, breaker bars or any other sharp-tipped instruments is not permitted. Such technique(s) shall be used at a sufficient number of locations to verify the horizontal and vertical position of the obstruction. Completion of the potholing process(es) shall be documented with the written verification maintained on the work site as part of the work authorization/pre-job planning documents. Communicate the potholing documentation to the designated excavation/trenching Competent Person(s) and employees prior to performing additional excavation activities.

Actionee	Step	Action
		<p><i>Exception: If use of potholing has the potential to create a greater physical hazard or risk to employees, written authorization for excavating mechanically prior to potholing shall be obtained from the responsible Construction Manager or Facility Manager.</i></p> <p><i>NOTE: In areas determined to have potential radiological contamination, potholing may be performed using a guzzler controlled as a Radiological Control Vehicle (RCV).</i></p>
	1.	<p>Use only hand digging or other non-mechanical means when within 5-feet (or greater if specified by the utility owner) of exposed active or potentially active underground utilities.</p> <p>a. Mechanical excavation may commence within 5-foot boundary, up to within 2-feet of the obstruction, only after written permission (waiver) from the utility owner and/or the Project Manager is obtained. Maintain authorizations in the associated work authorization and pre-job planning documents on the work site.</p> <p><i>Exception: When a non-contaminated utility is known, located, isolated, according to DOE-0336 or air-gap performed, and the utility will be removed, partially removed or abandoned in place, then mechanical equipment may be used within the 5-foot boundary.</i></p>
	2.	<p>Once the active underground utility is located, establish and place a physical barrier where hand-digging or other non-mechanical means are required from either side of the obstruction to maintain the safe work boundary for mechanical excavation. This barrier must be capable of withstanding environmental conditions, without failing/degradation. The use of paint or tape (for markings) as a barrier is not acceptable.</p> <p><i>Exception: A physical barrier is not required when a non-contaminated utility is known, located, isolated, according to DOE-0336 or air-gap performed, and the utility will be removed, partially removed, modified, or abandoned in place.</i></p>
	3.	<p>Utilize a spotter, in direct communication with the equipment operator, if machine excavating within 5 feet of an active or potentially active underground utility. The spotter shall not perform spotting duties for more than one equipment operator at a time and may not perform any other duties.</p> <p><i>NOTE: The method of communication must take into account needs for enhanced spotter visibility and potentially high noise levels common with heavy equipment operation.</i></p>

Actionee	Step	Action
	p.	Comply with the following measures to prevent accidental damage or disturbance to underground utilities/obstructions when hand digging . <ol style="list-style-type: none"> <li data-bbox="511 367 1315 462">1. Ensure the review of scan data including facility drawings and underground obstructions identified and evaluated for protective measures. <li data-bbox="511 504 1421 640">2. Direct-buried electrical cables shall be de-energized and put into a safe condition prior to performing any excavation activity within 5-feet of the utility. If it is not known if the utility is direct buried or protected by conduit, or encased in concrete, it shall be treated as direct buried. <p data-bbox="560 672 1429 808"><i>Exception: Hard, dense soils where conventional hand excavation tools are not effective may require the use of hand held power equipment. These methods have the potential to damage conduit and energized cables must be de-energized.</i></p> <li data-bbox="511 840 1429 1711">3. Where it has been determined that de-energizing direct buried cables is impractical or creates a greater hazard, only hand digging is permitted within five (5) feet of the utility and the following safety precautions shall be followed: <ol style="list-style-type: none"> <li data-bbox="609 997 1421 1144">a. Use only non-conductive hand tools (e.g., shovel with fiberglass handle), vacuum excavation, or an air lance to loosen soils. Use of picks, breaker bars or any other sharp tipped instruments is not permitted. <li data-bbox="609 1155 1429 1291">b. Use properly rated electrical protective, insulated gloves per the appropriate ASTM D120, Standard Specification for Rubber Insulating Gloves. Refer to Appendix G for User Guide Checklist for Insulating Rubber Gloves. <li data-bbox="609 1302 1372 1438">c. Ensure that a qualified person trained in Cardio Pulmonary Resuscitation (CPR) and First Aid, and emergency electrical practices during excavation is in the vicinity of live electrical power sources. <li data-bbox="609 1449 1421 1543">d. Periodically verify suspected cable locations with hand-held detection equipment or other acceptable means of locating utility installations. <li data-bbox="609 1554 1421 1648">e. Ensure that a qualified electrical worker is assigned to handle any direct buried cable that cannot be de-energized or needs to be moved. <li data-bbox="609 1659 1421 1711">f. Mark energized direct buried electrical cable uncovered by excavation with red Danger tape and protects cable from damage.
	q.	If unidentified field conditions or deviations between the composite map and existing drawings are discovered during excavation, stop work, then notify the Technical Representative (TR) and obtain approval before proceeding. <p data-bbox="462 1858 1364 1921">NOTE: Deviations include unrecorded and misrecorded utilities, as well as expected items that are not found.</p>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
	r.	If a suspect waste site (discovery sites) or existing waste sites are disturbed unintentionally during excavation, stop work, and then report immediately to the Facility/System Owner or project environmental compliance contact.
Equipment operator	s.	Excavate in accordance with the work package.

4. Completion of excavation activity.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
TR	a.	If backfilling is not part of the work scope, skip to step e.
	b.	Ensure that there is no physical damage to exposed installations and that the installations are properly supported to prevent subsequent damage from backfilling.
	c.	Install or replace equipment or installation identification marking or identification tape, as required.
	d.	Coordinate backfilling activities with the removal of protective and support systems.
	e.	If no installations are to be retained, then skip to step h.
	f.	Notify facility/system owner(s) of any deviations between what was actually found and/or installed, and configuration indicated on drawings or in work
Permit Reviewers or Facility/System Owner	g.	Update configuration documentation (drawings) for use in future excavations with as-found and as-installed information, provided by the Responsible Person or Competent Person.
Site Excavation Coordinator	h.	Note that the permit is completed. Scan the copy of the permit and save in the shared area.

6.0 FORMS

[Daily Excavation/Trenches Safety Inspection Log, A-6001-937](#)

[Environmental Activity Screening Form, A-6003-727 or equivalent](#)

Hanford Site Excavation Permit, A-7400-373

Request for Cultural and/or Ecological Resources Review for the Hanford Site, [RL-665](#) or equivalent

7.0 RECORD IDENTIFICATION

Performance of this process generates the following records as applicable. Records are maintained in accordance with contractor records management processes.

Records Capture Table

Name of Document	Submittal Responsibility	Retention Location
Hanford Site Excavation Permit	Responsible Person, Facility/System Owner	Project File/Work Package
Geophysical Evaluation	Responsible Person, Facility/System Owner	Project File/Work Package
Daily Excavation/Trenches Safety Inspection Checklist and Log	Responsible Person, Facility/System Owner	Project File/Work Package
Environmental Activity Screening (EAS) form or Natural Resources Disturbance/Excavation Checklist	Responsible Person, Facility/System Owner	Project File/Work Package
Cultural and/or Ecological Resource Review	Responsible Person, Facility/System Owner	Project File/Work Package

8.0 REFERENCES

10 CFR 851, "Worker Safety and Health Program," *Code of Federal Regulations*, as amended.

29 CFR 1926, Subpart P, "Excavations," *Code of Federal Regulations*, as amended.

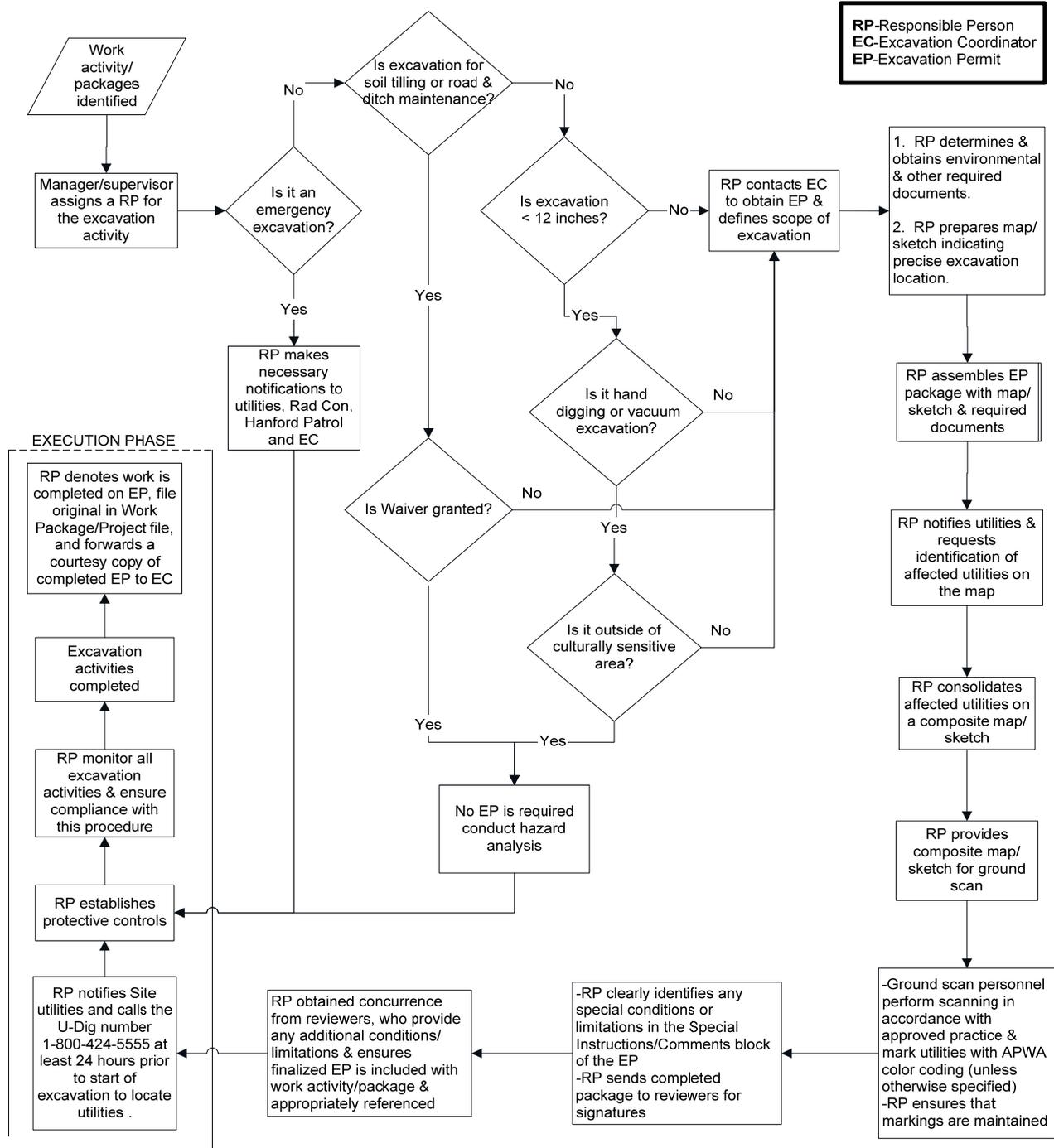
ANSI/ASTM D120-02, *Standard Specification for Rubber Insulating Gloves*.

APWA 1997, *Excavator's Damage Prevention Guide*, American Public Works Association.

DOE-0336, *Hanford Site Lockout/Tagout*, U.S. Department of Energy, Richland Operations Office.

[DOE M 450.4-1](#), *Integrated Safety Management System Manual*, U.S. Department of Energy.

APPENDIX A. Excavation Process Flow



APPENDIX B. Definitions

Term	Definition
Benching	A method of protecting employees from cave-ins by shaping the sides of an excavation to form one or a series of horizontal levels or steps, usually with near-vertical surfaces between levels.
Competent Person	The Competent Person must be capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. See Appendix F for list of requirements and duties.
Company Excavation Coordinator	The individual(s) assigned company-wide responsibility as the initial and continuing point-of-contact for excavation requirements and related matters, such as maintaining a permit logging system, managing an excavation web site, coordinating multi-contractor work interfaces, and providing technical guidance when necessary or requested.
Composite Sketch	A collection of data or drawings that depict the excavation area, identified or potential excavation interferences. This may include drawing research, interviews, aerial photographs, and scan data, etc. The composite sketch evolves throughout the excavation permitting process, beginning as a sketch showing the location of the excavation, and ending as a sketch showing the location with all nearby interferences (utilities, wells, waste sites, etc.).
Cultural/Ecological Resources Review	A review of the biological, cultural and ecological resources of an area (e.g., plants, animals) and potential impacts to those resources due to a proposed activity. This may include a review of archaeological, historical or paleontological resources of identified areas.
Excavation	Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal. Subsurface penetrations (e.g., installing ground rods, trailer anchors, etc.) are considered to be excavations for the purpose of this procedure.
Excavation Permit	A permit used to document the excavation location, reason for the excavation-related work, package or project number, and required drawing changes. It also documents conditions for and review/acceptance of the excavation activities.
Facility/System Owner	A person responsible for a facility or a system, i.e., Plant or Utility manager.
Hanford Site	For the purposes of this procedure, Hanford Site refers to all lands controlled by the U.S. Department of Energy (DOE).
National Environmental Policy Act (NEPA) Documentation	Documentation (e.g., Site-Wide Categorical Exclusion, Environmental Assessment) that identifies potential environmental impacts that could result from a planned activity.

Term	Definition
Permit Originator	<p>The individual assigned responsibility for identifying the need for an excavation. Typically, this is:</p> <ol style="list-style-type: none"> 1. <u>Force Account Work</u>. Construction manager, construction superintendent, or construction engineer. 2. <u>Contractor Work</u>. Contract field engineer or project manager. 3. <u>Maintenance/Facility Work</u>. Technical Representative, Person-In-Charge (PIC), or planner.
Potholing	<p>Use of non-mechanical techniques, such as hand digging or use of a vacuum extractor (guzzler or similar) at a sufficient number of locations to verify both horizontally and vertically the position of an obstruction.</p>
QMap	<p>QMap (Query Map) is a web based geospatial data portal that is a shared resource for use by all the Hanford Contractors. It can be accessed on the Hanford Intranet (www.rl.gov/qmap). Map additions and corrections are updated regularly. QMap has replaced the Hanford Atlas.</p> <p>All HLAN users can view the General Access Map. A more detailed map set is also available on QMap. Security issues require users be provided official access to the detailed mapping tools. Official access can be requested by calling the Environmental Information Systems group (375-WIDS) or by selecting the "Request" button on the QMap main mapping page. A list of QMap Points of Contact is on the QMap Home Page.</p>
Registered Professional Engineer	<p>A person who is registered as a professional engineer in the state where the work is to be performed.</p>
Responsible Person	<ol style="list-style-type: none"> 1. Planning Activities. The designated individual, or individuals who initiate and coordinate the development or revision of a work package, including the excavation permit. 2. Field Work Activities. Depending on the organization performing the work, this function is typically called a Field Work Supervisor (FWS), Person-In-Charge (PIC), Construction Engineer, Construction Superintendent or Construction Field Engineer. Within this procedure, the term "Responsible Person" is used generically to refer to this designated person. In some cases, when appropriately trained and qualified, the Responsible Person can also be assigned as the Competent Person (see Appendix F for duties).

Term	Definition
Site Excavation Coordinator	The single individual assigned site-wide responsibility as the initial and continuing point-of-contact for excavation requirements and related matters, such as maintaining a permit logging system, managing an excavation web site, coordinating multi-contractor work interfaces, and providing technical guidance when necessary or requested. Maintain a list of Company Excavation Coordinators. Maintain a list of contacts for permit review and concurrence, referenced by Hanford Site area. Maintains the Hanford Site Excavation Safety Program Web site.
Survey/Scanning Group	Organization that provides qualified personnel to operate ground penetrating radar or other forms of geophysical evaluation/scanning equipment and interpret their output.
System Engineer Technical Representative	<p>Person technically qualified to represent the configuration of a specific system.</p> <p>A person that has the authority and knowledge to authorize portions of or a complete project. This may be a Director, Manager or any of the following examples:</p> <ol style="list-style-type: none"> 1. <u>Construction Projects</u>. This is the Technical Representative for the user/sponsor organization throughout the life of the project. 2. <u>Engineering</u>. The engineer assigned responsibility for obtaining operations, safety, and engineering approvals and permits before excavation work is started. 3. <u>Environmental Compliance Officer</u>. This is the Technical Representative for environmental input throughout the life of the project.
Tolerance Zone	The area 2 feet (0.6 meter) or 5 feet (1.5 meters) from the outside dimensions of all sides of the underground utility, for locating and marking the underground utility.
Trench	A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width measured at the bottom is not greater than 15 feet (4.6 meters).
Work Package	A package consisting of forms, documents, procedures, permits, work instructions, etc., as required by a work control process, utilized by workers to accomplish a defined task. For construction project work, the work order/project controlling document is the work package.
Waste Information Data System (WIDS)	A database containing information about existing waste sites. The WIDS database can be accessed via the Hanford intranet or by calling 375-WIDS .

APPENDIX C. Hanford Site Excavation Permit (Example)

HANFORD SITE EXCAVATION PERMIT NOTE: Use Formal Operations Work Release to Control Work			EXCAVATION PERMIT NO.		
			LAST PERMITTED START DATE		
1. Work Package No.	2. W.O./Project No.	3. Location of Excavation			
4. Originated By/Phone		Date	5. Change Notice (ECN, DCN or FMP) Number.		
6. Drawings, Plans/Procedures Required (Identification Numbers)					
7. Description of Work (Attach composite drawing of excavation location and all known interferences)					
8. Special Instructions and Comments (Notify Site Utilities and call the U-Dig number (1-800-424-5555) at least 24 hours prior to digging. Walk down the excavation site and verify that scan marks are still visible - If not, call scanning organization to refresh marks. When anything unusual or unexpected is identified in an excavation, STOP until the discovery can be properly evaluated. Also refer to any company-specific safety procedures.)					
9. List Facilities, Services, Utilities, and Groundwater Wells Affected by Excavation					
REVIEW/CONCURRENCE: Insure Permit Is Completed Acceptably and Safe Work Conditions are Achievable					
10. Design Authority / Technical Representative		Date	18. Traffic Engineer		Date
11. Environmental		Date	19. Road and Track Maintenance		Date
12. Radiological Control		Date	20. Safeguards and Security		Date
13. Steam System		Date	21. Land Use Planning/600 Area Landlord		Date
14a. Electrical Utilities (Transmission/Distribution)		Date	22. Sanitary Sewer		Date
14b. Facility Electrical Systems (Secondary)		Date	23. Facility/System Owner(s)		Date
15. Water Utilities		Date	24. Other		Date
16. Telecommunications		Date	25. Responsible Manager		Date
17. Transfer Lines & Process Sewer		Date	26. U-Dig Ticket # _____		
Contact any affected parties (such as U-Dig) at least two days prior to start of excavation.					

INSTRUCTIONS FOR COMPLETING THE HANFORD SITE EXCAVATION PERMIT

(Reference: PRC-PRO-090)

Excavation Permit No.	Call the Hanford Site Excavation Coordinator, 373-6850, to log in your permit data and receive a permit number.
Last Permitted Start Date	Enter the last permitted start date for this excavation permit. This date should be no more than 90 days from the last signature. Refer to this procedure for more details.
Blocks 1 & 2	Enter Work Package Number or appropriate source of funds or project number, if known.
Block 3	Enter brief location where excavation work is to be performed (include Section, Township, Range, and Global Positioning System (GPS) coordinates).
Block 4	Enter permit Originator name, phone number, and date of preparation.
Block 5	If excavation associated with an Engineering Change Notice or Facility Modification Package), enter ECN/FMP Number.
Block 6	List drawings and plans/procedures that describe the work to be performed.
Block 7	Describe the purpose of the excavation work. Attach a composite map identifying each of the areas to be excavated and all known interferences in the area of excavation. NOTE: The composite map is part of the excavation permit.
Block 8	Enter special instructions/comments or requirements relating to the excavation.
Block 9	List utilities, services, facilities, and groundwater wells that will or may be affected by the excavation.
Blocks 10 - 25	Obtain review/concurrence from designated organizations. Refer to Appendix D . Each reviewer shall print, sign, and date.
Block 26	Enter the Ticket number provided when the U-Dig number (1-800-424-5555) was called.
Points of Contact	Web page at http://www7.rl.gov/rapidweb/excavation/index.dfm?pagenum=1 Excavation Coordinator: Cindy Johnson: 373-6850
The original completed Hanford Site Excavation Permit is to be maintained in the Work Package/Project file. A courtesy copy shall be provided to the Hanford Site Excavation Permit Coordinator.	

APPENDIX D. Excavation Permit Review and Approval Guidance

The following guidance identifies the required reviewers and provides information related to contractor interfaces to assist in completing the Hanford Site Excavation Permit.

Each proposed excavation location requires an assessment of site conditions to determine the required notifications and permit approvals. If the excavation location is adjacent to an active facility (e.g., the 100-K or 300 Areas), additional steps, such as activity coordination and extra signature approvals, may be required.

Approval Block Details

A current list of potential reviewer names, phone numbers and fax numbers can be obtained from the Excavation Permit Coordinator or from the Excavation [web site](#).

- **Technical Representative (Block 10)**

Signature Block 10 is signed by the Technical Representative.

- **Environmental (Block 11)**

The responsible environmental contact reviews the permit for ecological and cultural compliance and for compliance with environmental regulatory requirements. Block 11 will be signed when all the items on the environmental activity screening form or equivalent have been addressed. This is a mandatory signature and cannot be determined to be "N/A."

- **Radiological Control (Block 12)**

A qualified Radiological Work Screener or owning project/activity Radiological Work Planner/Engineer shall be consulted to determine if a radiological work permit (RWP) is required for the proposed excavation. Their concurrence is noted by signing the "Radiological Control" signature block.

- **Steam Utility (Block 13)**

A permit review is required from the steam utility contractor (Excavation Permit Coordinator maintains a current list of contacts) for excavations proposed near active steam utility equipment or underground natural gas pipe lines in the 300 Area. Facility-specific steam generating plants are located inside the 200 Areas, 300 Area, and 400 Area.

- **Electrical Utilities (Transmission/Distribution) (Block 14A)**

The Hanford Site electrical utilities group is required to review all excavations where mechanical equipment may come within 10 feet (3 meters) of known energized underground and overhead lines or within 20 feet (6 meters) of power poles or utility equipment. A map or a sketch clearly showing the excavation location and geophysical evaluation/scan data (if applicable) will be provided to the electrical utilities representative in areas where an electrical utilities review is required. In some cases, precise coordinates may be required. The electrical utilities representative is responsible for the electrical transmission/distribution system. The Excavation Permit Coordinator maintains a current list of contacts.

- **Facility Electrical Systems (Block 14B)**

Secondary electrical systems owned by facilities need to be reviewed by the Facility Owner and the Contractor's Utilities group (if applicable) to identify electrical system and lines to facilitate safe work and to prevent damage to the building electrical systems. Signature indicates that secondary electrical systems are properly identified and protected from damages during excavation work. The Excavation Permit Coordinator maintains a current list of contacts.

- **Water Utilities (Block 15)**

The site water utilities or facility-specific utilities group reviews all excavations that are within 5 feet (1.5 meters) horizontally or vertically of water utility lines. A map with coordinates or a sketch clearly showing the excavation location and geophysical scan data (if applicable) will be provided in areas where a water utilities review is required. It is possible that multiple contractor reviews may be required to address Block 15 issues.

- **Telecommunications (Block 16)**

Site telecommunications contractor reviews the Hanford Site for underground and aerial lines and communications equipment concerns. Send the form and a sketch of the excavation location to the Hanford Site telecommunications representative.

- **Transfer Lines and Process Sewer (Block 17)**

Signing the permit indicates that transfer and/or process sewer lines are identified, controlled, and protected as necessary. The Web site lists the various area representatives responsible for this review. The applicable facility or system representatives will review the permit to protect radioactive waste transfer lines, process sewer systems and workers. (Signing the permit indicates that transfer and/or process sewer lines are identified and appropriate control measures are defined.)

- **Traffic Engineer (Block 18)**

Any excavation that will interrupt the flow of traffic, interfere with the movement of safety vehicles, inhibit emergency egress of personnel, installation of signs along road shoulder, or new access roads onto the main traffic routes will require the notification and signature of the Hanford Traffic Safety Engineer.

- **Road and Track Maintenance (Block 19)**

Site Transportation Services reviews excavations within 25 feet (7.6 meters) of the center line of any railroad track or within 25 feet of any road base (outside edge of road shoulder). Excavations affecting railroad track may require the track to be restored to its original condition after the project is completed.

- **Safeguards and Securities (Block 20)**

Hanford Site Safeguards and Securities will be notified of any excavations within, through, or adjacent to protected areas, security fences and secured facilities, or any excavations that may interfere with security alarm systems or operations of security forces.

- **Land-Use Planning/600 Area Landlord (Block 21)**

When a site evaluation is required for a construction activity anywhere on the Hanford Site, approval of the excavation permit is required by the Hanford organization assigned the responsibility of Land Management. If an excavation is planned to occur in the 600 Area, approval from the 600 Area Landlord is required.

The 600 Area Landlord is responsible for all borrow pits. A notification of intent to remove material from a borrow pit is required prior to borrow pit entry. Active borrow pits require an annual excavation permit review and concurrence for long-term projects. The 600 Area Landlord will initial and date the permit to acknowledge ongoing activity.

- **Sanitary Sewer (Block 22)**

Site Water Utilities and the Contractor's Utilities Operations and Closure groups (if applicable) review excavation permits where activities are within 5 feet (1.5 meters) horizontally or vertically of sanitary sewer lines for potential interference. It is possible that multiple contractor review/concurrence may be needed to adequately address certain specially located excavations. Signature indicates that sanitary sewer systems are properly identified, isolated, controlled, or protected from damage during excavation work.

- **Facility/System Owner (Block 23)**

When excavations are performed within or adjacent to an active or deactivated facility or waste site, the person responsible for the facility will review and sign the excavation permit. If excavation will be in proximity to multiple facilities, this signature block may have several approvals.

The Hanford Site Well Coordinator is responsible for concurring with excavations proposed within 20 feet (6 meters) of completed wells or the removal or modification of the access road to a completed well and to acknowledge his/her review by signing in Block 23. Comments or excavation instructions should be placed in Block 8 or included as an attachment.

- **Other (Block 24)**

Additional signature(s) if required other than those listed in the previous blocks.

- **Responsible Manager (Block 25)**

This signature is for the Responsible Manager and is signed after all the other signatures have been obtained. This signature indicates the excavation permit has been properly completed and approved prior to performing any excavation.

APPENDIX E. Color Code and Marking Standards

American Public Works Association Uniform Color Code

Red	Electric
Yellow	Gas-oil
Orange	Telephone-CATV
Blue	Water
Green	Sewer
Pink	Survey
White	Proposed excavation
Purple*	Reclaimed water lines

*This color will be used to indicate unknown linear anomalies.

APPENDIX F. Competent Person Requirements and Duties**Requirements**

For excavations 4 feet and greater the Competent Person shall be trained in accordance with HAMMER Course number 750000 or OSHA course number 3010 or equivalent. Contractors shall submit evidence of formal training and/or experience for evaluation prior to excavation activities on the Hanford Site.

Duties

The individual(s) assigned to act as Competent Person for excavation work is (are) trained and knowledgeable in soils analysis, use of protective systems, and the pertinent requirements of 29 CFR 1926 Subpart P, and are responsible to perform the following functions, as they apply:

- Understand the requirements of this and other related procedures and be able to recognize and abate potential hazards associated with excavation work.
- Conduct inspections of the excavation, adjacent areas, and protective systems (initially, as conditions change, following a rainstorm or other hazard-increasing occurrence and at least daily during periods of active work) to identify potentially hazardous conditions, and maintain inspection logs in the project file until the job is completed.
NOTE: The *Daily Excavation/Trenches Safety Inspection Log, Site Form [A-6001-937](#)* may be used to document results of the inspection.
- Halt operations in the event of an emergency or to correct unsafe work practices (e.g., remove employees from exposure to excavation areas deemed to be hazardous), and initiate corrective action. In case of a fire, medical emergency, hazardous materials spill, or need for rescue contact the Hanford Fire Department by calling **373-0911** if using a cellular phone, **911** if near a building, or if near a red Radio Fire Alarm Reporting box, push the front button. If calling by phone, give the dispatcher information as to location and stay on the phone until directed to hang up.
- Select a protective system to prevent cave-ins based on soil analysis, excavation depth, and expected sidewall loads.
- Evaluate excavations less than 5 feet in depth for application of a protective system.
- Ensure that selection of protective shoring and shielding systems is in accordance with manufacturer's instructions or engineered designs.
- Choose the proper sloping or benching configuration, where such techniques are employed.
- Determine how much to reduce a slope below the maximum allowable level when equipment, material, or personnel loads are imposed.
- Protect workers from falling loads.
- Protect workers from exposure to vehicular traffic.
- Protect workers from falling into an open excavation.
- Provide for and monitor water diversion or dewatering to prevent/control accumulation in the excavation.
- Ensure proper installation and maintenance of a system for entering and exiting the excavation.
- Locate and protect underground installations and surface encumbrances.
- Obtain Structural Engineer support to design and build structural ramps to be used for employee means of egress from excavations.
- Evaluate the excavation for application of *confined space* controls.

APPENDIX G. USER GUIDE CHECKLIST FOR INSULATING RUBBER GLOVES

This checklist is primarily intended to help ensure the safety of non-electrical workers who occasionally use insulating rubber gloves for blind penetrations, hand excavations, and other tasks where hidden energized electrical circuits could be accidentally contacted. It also can be a useful refresher for workers who receive in-depth Personnel Protective Equipment (PPE) training, in NFPA 70E, *Standards for Electrical Safety*, or similar electrical safety-related courses. This checklist should be reviewed, completed, and signed by the PPE user and the supervisor or Person-In-Charge (PIC) before using insulating rubber gloves. Those who have little or no experience with this equipment should seek assistance from a person who is trained in and knowledgeable of the use and care of insulating rubber gloves, e.g., an electrician.

I. Manufacture, Marking, and Voltage Ratings

- [] AC voltage ratings:
- | | | | |
|-------------|----------|--------------|---------|
| 500 volts | Class 00 | 17,000 volts | Class 2 |
| 1,000 volts | Class 0 | 26,500 volts | Class 3 |
| 7,500 volts | Class 1 | 36,000 volts | Class 4 |
- [] Cuff marked with manufacturer's name, ANSI/ASTM D 120, type, class, and size.
- [] Marked with date of issue by Electrical Utilities (EU) or manufacturer's test date.

II. Inspection and Testing

- [] Verify PPE is within retest period (no more than 6 months from date on gloves).
- [] Visually inspect for cracks, holes, tears, rough spots, and other visible defects. Pay special attention to working area of gloves – palm, fingers, and thumb. **Do not use damaged gloves!**
- [] If contrasting colors (two-colored layers) are seen during examination, gloves are not safe to use.
- [] Visually inspect for foreign substances – oil, grease, dirt, etc. Gloves must be CLEAN.
- [] Demonstrate air leakage test. Perform this test before use.
- [] Periodically examine gloves during work, especially if exposed to damage, metal shavings, etc.
- [] Examine leather gauntlets for embedded objects, contamination, tears and holes, etc.

III. Use

- [] Leather gauntlets must be used to provide mechanical protection for the rubber gloves.
- [] Gauntlets do not provide insulating protection from energized conductors and circuit parts.
- [] Do not use leather gauntlets as normal work gloves.
- [] Periodically examine rubber gloves and gauntlets during work, especially if exposed to damage, metal shavings, etc.

