

**Construction Procedure *for***  
**Soil Excavation**  
**(Digging, Grading,**  
**Tunneling,**  
**Trenching, and/or**  
**Drilling) Permits**  
**At LLNL**

**(Formerly known as MOP 02003)**

**Revision 16**  
**December 9, 2004**

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**Approvals**  
**Soil Excavation Permit Procedure**  
**(Digging, Grading, Tunneling, Trenching and/or Drilling)**  
**Rev. 16**  
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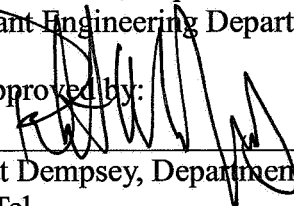
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# **1. Purpose**

The purpose of soil excavation permit procedure is to detail the process and requirements for receiving an approved Soil Excavation work permit for all work at sites 200 and 300. Soil Excavation is defined as digging, grading, tunneling, trenching, and/or drilling below grade. Penetrations of slab on grade, including asphalt and sidewalk, are also treated as Soil Excavation. This procedure requires that the excavation site and all available documentation be reviewed thoroughly for hazards. The Soil Excavation Permit Process has been established to assure the safety of personnel, protect of the environment, ensure operational reliability, maximize communications, and ensure completion of accurate as-built/as-constructed drawings and project documentation.

## **2. Application**

All potential excavations at Sites 200 and 300 must at a minimum be brought to the attention of the Permit Office to be scheduled for a utility location survey. It will then be determined by the Permit Office if a permit is necessary. Variances will be given by the Permit Office on a case-by-case basis.

### 3. Variances

The Permit Office, with the concurrence of the Utilities, determines when a permit is needed and when a utility location survey is sufficient. The Permit Office will stamp the Locator form with “NO PERMIT OR UTILITY REVIEW REQUIRED” in these instances. The RI must stop by to pick up the stamped form and post it on the job site at all times. All variances are at the discretion of the Permit Office. Possible variance situations are detailed in the list below.

**NOTE:** Variances apply to the Permit portion of this procedure only. The job will still require any applicable Archeologist approval, Wildlife Biologist approval, Outages, or any of the other pre-permit and excavation reviews as detailed in Sections 6.2 & 6.8.

- When the proposed Soil Excavation is in an unimproved area of Site 300, the Site 300 Permit Office may grant a permit variance when it has been determined that the proposed dig will not be in conflict with the intent and/or objective of this permit procedure.
- All asphalt and sidewalk removal will be treated as slab on grade (soil permit) and will be located as a minimum requirement. If utilities are not found within 30” of the proposed dig, a permit may not be required, (per the discretion of the Permit Office and UTel.)
- Asphalt removal must be located. If utilities are not found within 30” of the proposed dig, a permit may not be required, (per the discretion of the Permit Office and UTel.) However, destructive means to remove asphalt must be limited to the depth of the asphalt. When a discrepancy is found between the line location results and the as-built drawings, the sketch the Utility Locators produce will be forwarded to the utility owner’s organization for updating of CAD files no matter what the depth of the proposed asphalt dig.
- Replacement of existing street signs, fence posts, etc., must be located. If no utilities are found within the 30” radius of the proposed replacement, the Permit Office may issue a variance requiring no utility review or permit. If there are utilities in the area, a full utility review and permit must be issued before digging and or repair can commence.

- Excavation directly over a known utility and/or placement of cement pads must be reviewed and permitted because of possible weight damage to underground utilities. No variances will be granted for cement pads.
- If the RI wishes to use destructive means (using power-operated or driven excavation equipment) of excavation within 30" of located utilities, all involved utility owners must give their permission in writing or via e-mail. This permission must be provided to the Permit Office prior to using such equipment. The permit desk will file copies of these permissions, which will constitute a variance to the 30" rule detailed in section 6.10.2.

## 4. Definitions

### 4.1 Requester

Any LLNL or contract employee may request a locating survey to determine the location of buried utilities and/or substructures.

### 4.2 Responsible Individual (RI)

An RI must be an LLNL Employee and comes primarily from the groups listed below.

1. Project Managers from Plant Engineering
2. Construction Managers for Purchase Order (PO) construction subcontracts and blanket contracts
3. Construction Coordinators for Labor Only construction subcontracts
4. Maintenance/Operations Lead or First Line Supervisors in crafts
5. Second Line Supervisors
6. Maintenance Coordinators for PE facility maintenance work orders
7. Utility Managers, Engineers, and Coordinators in UTel
8. Those individuals whom program management has assigned the responsibilities and who have the skills, knowledge and abilities to manage a soil excavation project safely and within the guidelines set forth by this procedure. When the RI falls into this category, the cognizant Program Associate Director Facility Manager (ADFM) must provide the permit office with a completed certification form. The completed form along with successful completion of the RI testing requirement (see below) will constitute qualification of those individuals. The form may be obtained at intranet site location: [http://www-r.llnl.gov/plant\\_eng/safety/ism/permit\\_Forms.html](http://www-r.llnl.gov/plant_eng/safety/ism/permit_Forms.html)



An RI must also be certified annually before any permits will be issued. Go to the Plant Engineering web page for access to the RI Certification and Testing at: [http://www-r.llnl.gov/plant\\_eng/](http://www-r.llnl.gov/plant_eng/) After successful completion of the test, the RI's name is automatically entered into L-Train as successfully completing the requirement.

An RI may also delegate his responsibility for the portions of this procedure after the permit has been issued. The RI must assure the designee has the skills, knowledge, and abilities (SKAs) to assume this responsibility.

### 4.3 Utility Locators

Using the latest technology available, Utility Locators find and mark various underground utilities and substructures. Utility locators may be either LLNL Damage Prevention Technical Coordinators or third party approved utility locating contractors working through the Permit Office.

Individual Locators must meet, at a minimum, the competency standards and performance criteria of the National Utility Locating Contractors Association (NULCA,) the Common Ground Alliance (CGA), and be certified by a third party accredited organization as a Utility Locator on multiple utilities. All contractors shall follow the requirements set forth in the PO subcontract details of Division Subsection 01200. The RI is responsible to follow this procedure.

Contract (including PO Subcontract) Locators requesting work onsite at LLNL must first be approved by the Permit Office, see "General Safety Provisions" Division Subsection 01200, section 3.05A. Annually, or on an as needed basis, the Permit Office will perform verification of contract Locators field experience and third party certifications in locating multiple utilities and locating instruments. The Permit Office will approve individual contract Locators (not companies) for work onsite at LLNL only if they have met all training and certification requirements and complete the necessary documentation. Proof of training and certifications will remain on file at the Permit Office. An approved contract Utility Locator list is maintained by the Permit Office and is available for there all clients.

**NOTE:** The Permit Office maintains a safety/hit record for construction and locating contractors requesting work on site. Contractors will be evaluated based

on their record and may be refused work at LLNL based on their safety and accuracy.

## **4.4 LLNL Utilities**

Several LLNL utility organizations must review the utility location survey prior to the issue of the permit. If utility reviewers find any problems associated with the utility location survey and/or their utilities, they must contact the permit office immediately to remedy the situation. The review can be done via email/electronically. Utilities include:

1. Mechanical Utilities
  - Sanitary Sewage
  - Natural Gas
  - Compressed Air
  - City Water
  - Demineralized Water
  - Low Conductivity Water
  - Cathodic Protection System
2. High Voltage Utilities
3. Telecommunications
4. Low Voltage Utilities
5. Storm Drains
6. Special Waste Systems

## **5. Roles and Responsibilities**

### **5.1 Requester**

The requester is responsible to notify the Permit Office of all potential soil excavation projects and to make sure that the Permit Office and Utility Locators have all the information they need to start the process and undertake the utility systems location.

### **5.2 The Responsible Individual (RI):**

- Ensures external vendors or contractors follow this procedure and all other applicable (01200 subsection) procedures.
- Acts as the central point of contact to the Permit Office, Utility locators, project requesters/management, and workers regarding questions and issues pertaining to the permitted excavation.
- Is responsible for the safety of the job site and the correct implementation of this procedure. Additionally, the RI must follow the Integrated Safety Management (ISM) procedures set forth in the Environment, Safety & Health (ES&H) Manual. Any two safety related violations on the same project will result in a letter of violation to the RI and their Supervisor.

### **5.3 Utility Locators:**

- Must keep current on all training technology advances.
- Use their knowledge to provide the client with the best, most accurate utility location survey they can and to provide clear documentation of the results to both the Permit Office and the client.

**NOTE:** It is recognized by the Locating industry, that the accuracy of locating utilities within soil or concrete is not error free. The profession of locating buried utilities requires a combination of advanced instruments and equipment, properly trained personnel, and experience in solving utility-locating issues.

## **5.4 LLNL Utility Representatives**

- Are responsible to assist the utility line location survey and Permit processes by providing utility access, drawings, and technical expertise.
- Must make a representative available for field inspections of job sites when needed and within a reasonable time frame.

## **5.5 The Permit Office** (at Sites 200 & 300)

- Manages the Permit Process and database.
- Coordinates the efforts of various parties in the permit process.

## 6. Process

See Attachment 2 for a flow chart of the typical Permit Process. For examples of all permit forms, go to [http://www-r.lnl.gov/plant\\_eng/safety/ism/permit\\_Forms.html](http://www-r.lnl.gov/plant_eng/safety/ism/permit_Forms.html)

### 6.1 Pre-Permit Initiation Requirements

The RI, in conjunction with the requester:

- Ensures his/her RI certification is valid.
- Review as-built and historical construction project drawings and documents available by request from the Print Room in B551E and/or from program personnel (FPOCs and Building Coordinators are excellent sources for a buildings drawings) and submit all information to the Permit Office in B516 to expedite the utility location survey/Permit process.
- Uses the “Lessons Learned” web site for additional soil excavation 09 information. [http://www-r.lnl.gov/plant\\_eng/services/facilities/soil\\_concrete.html](http://www-r.lnl.gov/plant_eng/services/facilities/soil_concrete.html)
- Thoroughly examine the physical location of the project.
- Outline the perimeter of the project area in white (whiskers, flags or paint) in preparation for underground utility locating as per California Code 4216.
- Communicate the scope of work to the Locator verbally and through written drawings and documents.
- Determine if a Soil Engineering Excavation Evaluation (SEEE) is required.

**NOTE:** If As-builts are not available, the locator markings and/or the revised drawings and sketches generated during the utility location survey will subsequently be utilized as the basis for new “as-constructed” drawings.

**NOTE:** A set of Locator Utility Drawing books may be checked out/in at

the Permit Office. The Locators Utility Drawing books are controlled documents and considered to be "Official Use Only." Please refer to the LLNL OPSEC guidelines for handling instructions.

## **6.2 Permit and Utility Location Survey Initiation**

**6.2.1 The Requester** must schedule a Locator Survey through the Site 200 Permit Office (Building 516, Extension 3-PRMT) and supply marked-up drawings of the area.

- From the day the utility location survey is scheduled with in-house locators to the day a permit may be issued is about **14 calendar days**. Emergencies will be handled accordingly.
- All project technical information must be supplied to the Permit Office before the permit is issued and after the project is completed.
- The scope of work is communicated to the Locator through verbal and written drawings and documents at this stage.
- Complex scenarios must be identified to the Utility Locator(s) and Utility Locator Supervisor.
- For PO Subcontracts or Streamline New Acquisition Process (SNAP) jobs using an approved outside locator, the Permit Office requires notification prior to the utility location survey in order to generate the appropriate forms for the locator. After the utility location survey is complete, the Requester must submit the completed locating survey along with a permit request to the Permit Office. The Permit Office will issue a permit within 15 calendar days of receipt of the completed survey package and permit request.

### **6.2.2 Wildlife Biologist's Approval**

The Permit Office will request a Wildlife Biologist's approval for all work at Site 300. At Site 200, the Permit Office will request the Wildlife Biologist's approval when the excavation is in an area of concern per the map provided by the wildlife biologists. The Permit Office will notify the RI when one is required. The Wildlife Biologist's survey generally takes 1-3 days.

**6.2.3 Archeologist's Approval:**

The Permit Office must Request an Archeologist's approval for all work at Site 300 in shaded areas of the "Site 300 Cultural Sensitivity Map". At Site 200, the Permit Office will request the Archeologist's approval when the work is in shaded areas on the "Site 200 Cultural Sensitivity Map" and at depths greater than indicated on the map. The Archeological review generally requires 1-3 days.

**6.2.4 Storm Water Pollution Prevention Plan (SWPPP) Compliance:**

Excavations within 20 feet of drainage channels must be identified by the Requester or RI at the time of Permit application and will be reviewed for compliance with the Laboratory's Storm Water Pollution Prevention Plan (SWPPP) by the Environmental Analyst. Please refer to Site 200: UCRL-AR110573-94 or Site 300 UCRL-AR110572-94 for more information, or contact the Environmental Operations Group and Environmental Analyst (EOG&EA) to complete the necessary review. SWPPP evaluations will generally take 2 – 3 days.

A "Site Evaluation Request Form" is used to notify the Environmental Protection Department (EPD), Environmental Operations Group (EOG), and Environmental Analyst (EA), of an upcoming Soil Excavation project. Please see Attachment 3 for contact information. Regulations are in Document 32.3 "Preventing Storm Water Pollution and Oil Spills" in the ES&H Manual.

[http://www-r.llnl.gov/es\\_and\\_h/swppp/s200/swppp-s200.html](http://www-r.llnl.gov/es_and_h/swppp/s200/swppp-s200.html)

**6.2.5 USA Dig Requirements**

For Soil Excavation outside the exterior perimeter fence at Site 200, or Site 300, contact USA North (Our local division of USA Dig) and the Permit Office for special instructions. See Attachment 3 for the contact list.

**6.3 Utility Location Survey**

**6.3.1 The Utility Locators:**

- Review the scope of the Soil Excavation project with the RI. On complex jobs, a walkthrough of the job site may be required at both the beginning and the end of the utility locating survey.

- Conduct a visual inspection of the job site, field verify the markings of the defined job site.
- Identify and mark all buried utilities and potential hazards (exposed conduit, manholes, valve boxes, transformers, etc.) using the Locator Soil Penetration Field Survey Checklist as a minimum guideline. See [http://www-r.llnl.gov/plant\\_eng/safety/ism/permit\\_Forms.html](http://www-r.llnl.gov/plant_eng/safety/ism/permit_Forms.html) for a link to sample checklist.
- Produce a Utility Location Report of all findings and include any appropriate sketches, as-built drawings, site map, notes, photos, etc. which must be supplied to the RI and Permit Office. See [http://www-r.llnl.gov/plant\\_eng/safety/ism/permit\\_Forms.html](http://www-r.llnl.gov/plant_eng/safety/ism/permit_Forms.html) for a link to sample permit forms. Note that photographs may not be taken by outside contractors. LLNL Locators or other LLNL staff must be called to take any necessary photographs.
- Mark identified utilities with the national standard colors per California Code 4216.
- Identify and contact utility representatives in regard to unknown utility line routing, High Voltage Manholes, Cable Vaults, etc.
- Use prescribed Locating techniques such as GPR, direct connect, induction by clamp, and as defined by the professional locator competency standards and performance criteria of the National Utility Locating Contractors Association (NULCA,) the Common Ground Alliance (CGA,) and the various instrument manufacturers.
- Use two Locators on complex jobs. When a job is located by an outside contractor, only an LLNL certified locator can verify the quality of work.
- When using an approved Outside Locating Contractor, LLNL Locators or Permit Office staff must be called to field verify marking and sketches, take any necessary photographs, and complete the package for the utility location survey.

### 6.3.2

#### **The Permit Office**



- Ensures an automated email will be sent to the RI 3 calendar days prior to the expiration of the Locator's survey if an approved permit has not been issued.

6.3.3 **LLNL Utility Representatives:**

- Provide access to all utility vaults when requested by the Locator and/or RI.
- Provide updated utility drawings to Permit Office when requested.
- Assist in the verification of questionable line routing.

## 6.4 **Utility Organization Review**

**The Utility Organization:**

- Review gathered information in the Permit application by reviewing utility sketches, notes, enlarged site map, photos, drawings, etc.
- Incorporate findings and recommendations in the Utility Location Report form and electronically sign the Utility Review Report Form within 24-hours (excluding weekends and lab vacation days) of notification. See [http://www-r.llnl.gov/plant\\_eng/safety/ism/permit\\_Forms.html](http://www-r.llnl.gov/plant_eng/safety/ism/permit_Forms.html) for a link to a sample of the Utility Review Report Form.

## 6.5 **Permit Generation**

- The RI must request and obtain the Soil Excavation Permit or Variance from the appropriate Permit Office within 15 calendar days of the Locating survey and before work is started. Please see Attachment 3 for the contact list.
- The Permit Office Issues the Permit and provides the RI with the Permit Package. The RI will need to add documentation of any other pre-excavation reviews, permits, and paperwork. See [http://www-r.llnl.gov/plant\\_eng/safety/ism/permit\\_Forms.html](http://www-r.llnl.gov/plant_eng/safety/ism/permit_Forms.html) for a link to sample permit forms.
- A Soil Excavation Permit is approved for 30 days. However, Permit extensions may be granted a maximum of 5 times, each for a period of 30

calendar days. Extensions beyond the maximum shall require a new permit at a minimum. At the discretion of the Permit Office, the job may need to go through the entire permit process in order to obtain the new permit.

## 6.6 Permit Approval

6.6.1 The **LLNL Utility Organization** sign-offs do not constitute an approval of the Locator Survey. They only indicate the LLNL Utility Organization review of the Locator Report.

6.6.2 **The Outage Requirement:** When excavating using destructive means, the RI must obtain all appropriate outages and/or implement lockout and tag (see MOP-02005) if there are utilities within 30” of the excavation site. If outages are not a viable option due to program requirements, the appropriate program representative (FM or ADFM) signature is required on the Permit (see link below) to exempt the RI from this outage requirement. Upon closure of the permit, the Permit Office will verify that the FM or ADFM signatures had been obtained as necessary. Potential outages are: Low Voltage, High Voltage, and Mechanical. For High Voltage and Mechanical outages, contact the appropriate organization within UTel. For Low Voltage outages, contact the Technical Administration Group of Plant Engineering.

[http://www.llnl.gov/es\\_and\\_h/hsm/doc\\_3.05/doc3-05.html#s9](http://www.llnl.gov/es_and_h/hsm/doc_3.05/doc3-05.html#s9)

6.6.3 **The RI Signature** indicates that he/she fully agrees to the scope of the document, is aware of all the requirements, and agrees to perform the work within the requirements of this procedure.

6.6.4 **The Permit Office** or designated representative signature indicates that the requirements of this procedure have been met up to this point.

## 6.7 Soil Excavation Permit Package

A Soil Excavation Permit Package consists of:

- Approved Soil Excavation Permit or “NO PERMIT OR UTILITY REVIEW REQUIRED” stamp on the Locator report
- Job Safety Analysis (JSA) (with Permit only)

- Utility Location Report with sketches, photos, etc.
- Locator Soil Penetration Field Survey Check List
- As-Built Drawings
- Historical Construction Project Drawings and Documentation
- A Site Map with Enlarged Project Section
- Archaeologists Report (where necessary)
- Wildlife Biologists Report (where necessary)
- A Soil Engineering Excavation Evaluation (SEEE) (where applicable)
- LLNL Utility Organizations Approval (where applicable)
- Site Evaluation Request Form/SWPPP Comments (where applicable)
- Any Applicable Utility Outage Documentation, such as for Low Voltage and High Voltage (please see PROC-CON-0004 for Low Voltage permit requirements or call UTel for the procedure on High Voltage).

## **6.8 Pre-Excavation Reviews and Requirements**

### **6.8.1 The RI must:**

- Review the completed Locating survey of underground utilities.
- After the initial locate is completed, ensure any changes of scope have a new Locating survey, utility review and Permit.
- If a SEEE is required, soil penetrations can not begin until the SEEE is performed and comments have been recorded. Comments must be turned in to the Permit Desk within 24 hours after the start of the project. Please refer to CFR 29 1926. See contact information in Attachment 3.

- Complete a Job Safety Analysis (JSA). The completed JSA shall be completed before work commencement and delivered to the Permit Office within 24 hours after start of project. See [http://www-r.llnl.gov/plant\\_eng/safety/ism/permit\\_Forms.html](http://www-r.llnl.gov/plant_eng/safety/ism/permit_Forms.html) for the link to a sample Soil Excavation Job Safety Analysis Checklist.
- If the RI has not turned in the SEEE (if required), and/or JSA within the 24-hour window, the RI will receive an “out of compliance” e-mail from the Permit Desk. The RI should respond with the necessary information immediately. The Permit Office will shut down any out of compliance jobs.
- Ensure the destructive equipment operators/excavators understand and follow the requirements of this procedure and conditions of the permit.
- Post a copy of the complete Permit Package (see Section 6.6) in clear view at the job site for the duration of the project.

#### 6.8.2

##### **The Permit Office:**

- Sends out an automated “Out of Compliance” e-mail to the RI and the Permit Office Supervisor if the JSA is not submitted within 24-hours of the start of construction. The RI must respond immediately to avoid job shutdown.
- Sends out an automated “Out of Compliance” e-mail to the RI and Permit Office Officials if a Soil Engineering Excavation Evaluation (SEEE) was needed and not performed.
- Any “Out of Compliance” job will be shut down by the Permit Office.

## **6.9 Permit Compliance Inspections**

All Permitted projects are subject to field compliance inspections. Field Inspections can occur without prior notification and are performed to assure compliance with ES&H requirements, safety, and adherence to this procedure. Field inspections will be performed by the TAG group when projects are performed by LLNL crafts. Field inspections will be performed by Inspection/Construction Coordinators or the TAG group for work

performed by vendors / contractors.

All incidents that have been found to deviate from this procedure will be reported to the Permit Office immediately. Reported incidents will be reviewed and corrective actions will be implemented.

Out of Compliance Projects: Any project found to be out of compliance with the permit, whether from lack of appropriate JSA, SEEE, other reviews, or other field requirements will be shut down by the Permit Office.

Any two safety related violations on the same project will result in a letter of violation to the RI and their Supervisor.

## **6.10 Excavation Work**

### **6.10.1 The RI must:**

- Create and maintain a safe work site.
- Minimize risk of damage to equipment and facilities.
- Plan the project to minimize unplanned utility outages.
- Assign appropriate responsibilities to specific individuals.
- Ensure external vendors or contractors follow this procedure.
- On an annual basis, ensure that all LLNL and supplemental labor crafts personnel and subcontractor employees review the video, "LLNL Soil Excavation & Penetration Permit Process Awareness". See the Permit Office or appropriate line management for availability.
- Each day, communicate the scope and the requirements of the permit to the LLNL and supplemental labor crafts personnel and subcontractor employees prior to the start of work.
- Each day, agree upon scope of work for that day with the LLNL and supplemental labor crafts personnel, subcontractor employees prior to the start of work.

- Identify and communicate acceptable and unacceptable work methods that are consistent with the permit to the LLNL and supplemental labor crafts personnel and subcontractor employees.
- Ensure any change of scope is reflected as a new Locating survey, and a new Permit.
- Ensure non-destructive means of excavation are used when in doubt of depth or location of buried object.
- Assure the Soil Excavation is performed using the appropriate techniques and equipment as per CFR 29 1926 Subpart P.
- Post a copy of the Permit Package in clear view at the job site for the duration of the project.
- Ensure the Locator's markings are clearly visible during the Soil Excavation, and that any re-markings are color coded per California Code 4216.
- Report any damaged utilities to the Permit Office first for a Locator response, secondly contact the appropriate LLNL Utility organization. See Attachment 3 for Contact information.
- Coordinate the removal of all recycled or excess dirt and material from the project site with Environmental Protection Dept (EPD). This does not require an additional permit. See Attachment 3 for the contact list.
- Marker Balls and Tracer Wire:

Contact the Site 200 Permit Office to request programmable marker balls. The RI provides the appropriate data for programming the marker balls. Programming is done by a damage prevention technician. See Attachment 1 for the Marker Ball Request Form.

During the process of backfilling, warning tape, tracer wire and programmable marker balls (per CA Code 4216 and LLNL General Safety Provisions Section 01200) shall be placed at the beginning and end of each utility line, and at each 100 feet interval of the utility line at a depth of approximately 12-inches

above the utility. If the utility line turns or offsets from a straight line, place markers there as well. (See Attachment 4 for an example of use.)

Tracer wire shall be taped or tie-wrapped to any non-conductive utility for future identification. See Attachment 4.

Warning Tape shall be placed two feet above the utility whenever possible. See Attachment 4.

- Update as-built drawings, sketches and documentation to show all project data and the newly placed programmable marker ball, warning tape and tracer wire. The as-built drawings, sketches and documentation shall be turned in to the Permit Office at the end of the project to update the CAD files.
- If utility is shallow or close to the surface, notify the Permit Office so the facility based GIS map and As-built drawings can be updated.
- Ensure workers use the appropriate protective measures, including:

**Personal Protective Equipment (PPE):** Safety Work Boots – include steel toe protection. (Electrically insulated steel toe work boots are optional):  
[http://www.llnl.gov/es\\_and\\_h/hsm/doc\\_16.01/doc16-01.html#23.3.12](http://www.llnl.gov/es_and_h/hsm/doc_16.01/doc16-01.html#23.3.12)

**General Protective Equipment:** Ground Fault Circuit Interruption (GFCI) – shall be utilized when electrical equipment is used in these operations.

**Other Appropriate PPE:** which may include gloves, safety glasses, hard hats, safety vests, etc.

- Make sure appropriate General Protective Equipment is used:  
Ground Fault Circuit Interruption (GFCI) – shall be utilized when electrical equipment is used in these operations.
- All penetrations remain within the marked perimeter.
- If during the soil excavation an underground utility or object is encountered that has not been previously identified, stop work and notify the Permit Office and the appropriate LLNL Utility organization immediately. Please see the contact list on Attachment 3.



**WARNING:** If during penetration an Electrical Line is damaged, and there has been an injury, call 911 on LLNL internal telephones or 447-6880 on cellular telephones. If no injury has occurred call the LLNL Shift Supervisor Office and the Permit Office. Please see Attachment 2 for contact information.

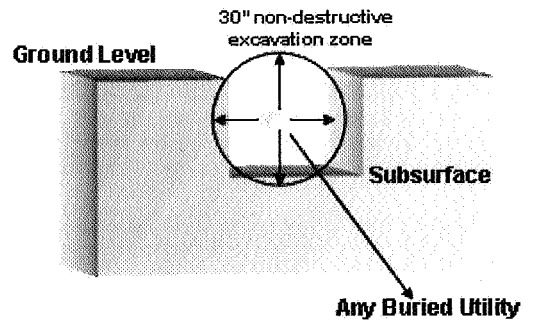


**WARNING:** If during penetration a Gas Line is damaged, evacuate the area and dial 911 on LLNL internal telephones or 447-6880 on cellular telephones. If no injury has occurred call the LLNL Shift Supervisor Office and the Permit Office. Please see Attachment 2 for contact information.

6.10.2 **Additional Requirements for Excavation of Identified Underground Utilities**

1. Excavations where utility depth is unknown or where utilities are known to cross or be within 30” of dig site:

**NOTE:** There are locations at Site 200 and 300 where direct buried telecommunications cabling exists. Several of the identified non-destructive means of excavation may damage the direct buried cables. In those cases, the only acceptable methods of excavation are vacuum, air knife or hand techniques.



The job must be “potholed,” (a 6”-8” wide hole to determine the depth and location of a utility) using non-destructive technologies to expose the two ends of the utility. Non-Destructive Means of excavation are safe technologies such as hand digging with a shovel, vacuum, air knife, hand techniques, or high pressure water techniques. When the depth is verified, the RI may authorize destructive means to within a 30-inch radius around the utility. When the 30-inch radius has been reached, non-destructive means must be used to expose the utility.

2. Excavations that cross existing subsurface utilities will:



- Perform excavation by non-destructive means within a 30-inch radius of the marked utility until required depth is reached or utility is physically located.
3. Soil Excavation that is paralleling or nearly paralleling (15 degrees or less) of known underground infrastructure will:
- Perform excavation by hand or by using non-destructive means until required depth is reached or utility is located. Repeat every 25 feet along parallel or nearly parallel trenches if actual location is at uniform depth. Decrease distance to 10 feet if depth is not uniform.

## 6.11 Project Completion and Closeout

The project is complete when the site has been cleared of debris and been returned to service. This includes backfilling, soil compaction, removal of excess soil, recycling or disposal of excess soil, and general cleanup of the work site.

### 6.11.1 The RI Must:

- Upon project completion, remove all marker flags/cones and ensure the project area has been cleared of debris and returned to service.
- Submit the data listed below to the Permit Office upon completion of the project:
  - As-Built drawings showing updated project data
  - Revised As-built drawings, sketches, photos, and printouts showing project data and locations of embedded utilities and solid objects.
  - Revised drawings and sketches showing project data and locations of warning tape, tracer wire and programmable marker balls.
  - Photographs or digital photograph files.
  - Approved and Complete Permit Package as posted at the job site.
  - Historical Construction Project Drawings and Documentation showing project updates
  - A Site Map with Enlarged Project Section
  - A Soil Engineering Excavation Evaluation (SEEE) (where applicable)
  - Outage documentation (Low Voltage, High Voltage, and/or Mechanical) where outages were necessary.

**6.11.2 The Permit Office shall:**

- Store and archive approved Permit documentation.
- Route applicable drawings and markups from completed project for update in CAD.
- Ensure an automated email will be sent to the RI upon expiration of the permit.
- Send out electronic notices of the permit/dig completion.

**NOTE:** If As-builts are not available, the locator markings or the revised drawings and sketches will be utilized as the basis for new “as-constructed” drawings.

## **7. Work Controls**

### **7.1 Change Control**

This document shall be reviewed periodically by the Originator or the Originator's supervisor and maintained by the Facilities Maintenance Management Division. The most current version of this document and all PE Procedures shall be used at all times. Obsolete versions shall be removed from service.

**Attachment 1: Marker Ball Request Form**

**Marker Ball Information Form**

Date:

Utility:

Depth:

Size:

Permit # :

Grid :

Comments :

Example: 100Ft. trench from south/west of building towards south.  
( please keep short )

Quantity:

Account # :

Drawing of area

Date:

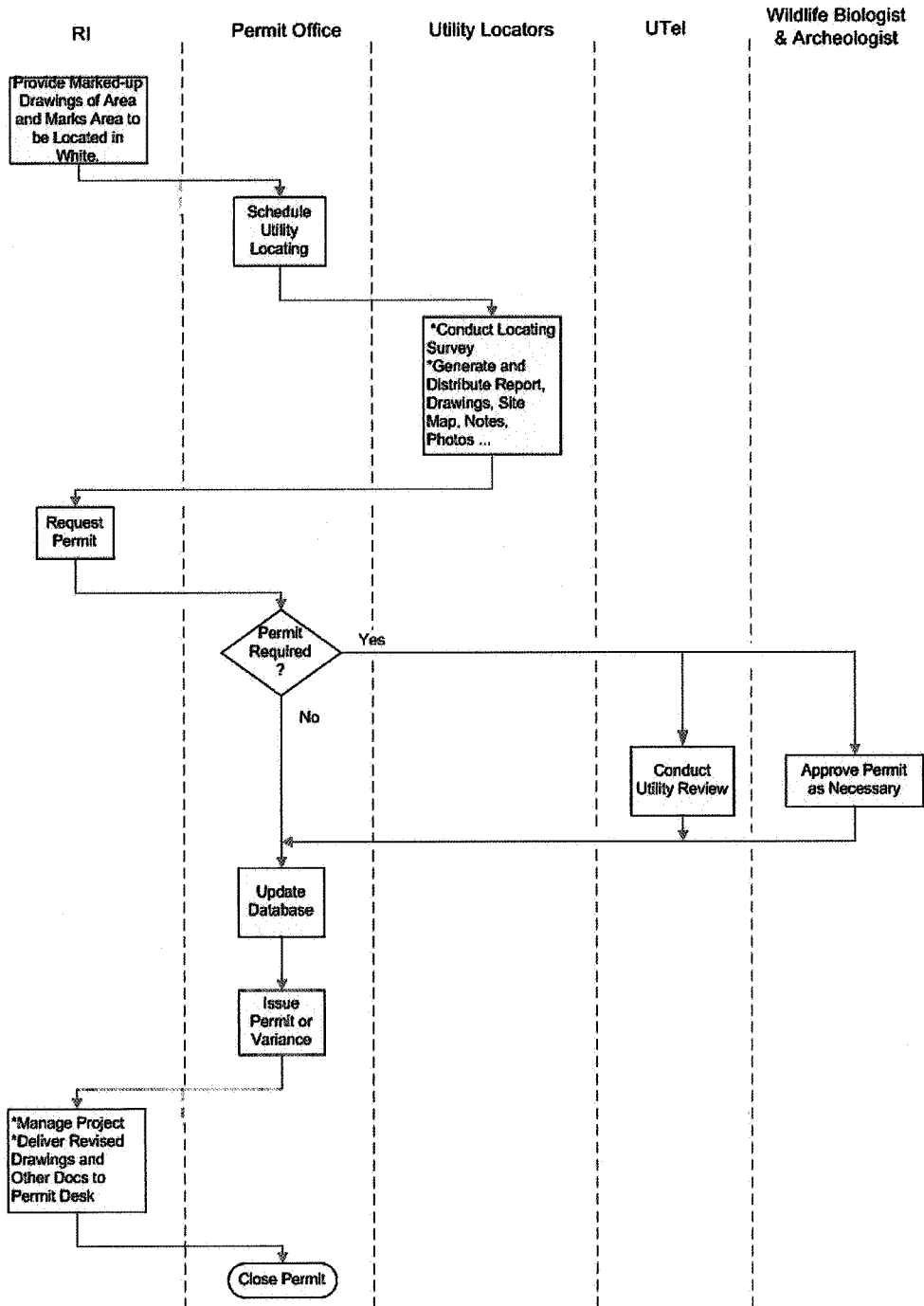
Building # :

PROC-CON-003 requires that Programmable Marker Balls and Tracer Wire be installed. 3M Programmable Marker Balls are available through the Permit Desk. The Permit Desk needs to be provided with the following information:

- 1) Type, size, and depth of utility;
- 2) Drawings showing Placement Area;
- 3) An account number or Permit number.

A Damage Prevention Technical Coordinator will program the balls, take pictures of the area, and direct you with the placement where each individual Marker Ball is to be placed. Marker Balls will be installed at the beginning, end, at tees or any change of direction as per PROC-CON-003. Marker Balls are never to be buried deeper than 5'. See attached diagram.

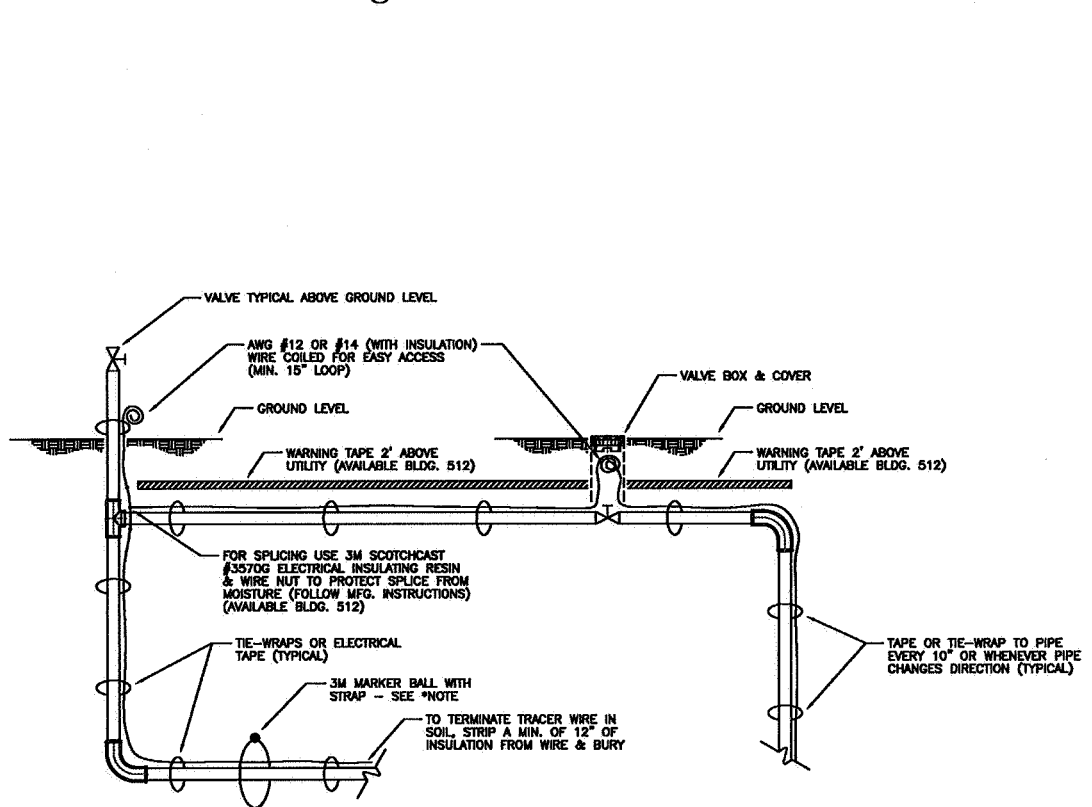
### Attachment 2: Typical Permit Process Flow Chart



**Attachment 3: Contact and Reference List**

<b>Contact/Reference</b>	<b>Primary Contact</b>	<b>Alternate Contact</b>
<u>Archeologist</u>	Carol Kielusiak 422-4056	Thom Kato 422-9642
<u>Environmental Operations Group Environmental Analyst (EOG EA) for SWPPP</u>	Site 200 Warren Rued 423-1147	Site 300 Dawn Chase 424-6684
<u>High Voltage</u>	Mark Cardoza 423-0490	Mike Minard 422-1224
<u>Lessons Learned Web Site</u>	<a href="http://www-r.llnl.gov/plant_eng/pe-org/soil_concrete.html">http://www-r.llnl.gov/plant_eng/pe-org/soil_concrete.html</a>	
<u>LLNL Shift Supervisor Office</u>	Site 200 call 422-9762 Site 300 call 423-5247	
<u>Utility Locators</u>	Bruce Fritschy 423-5677	Joe Pires 423-4568
<u>Low Voltage</u>	J.D. Smith 423-7961	Dan Klein 424-2540
<u>Mechanical Utilities Gas, Water, Sewage, Air</u>	Ray Chin 422-9386	Wayne Fritschy 423-5840
<u>Permit Office</u>	Site 200 423-PRMT Site 300 at 423-5211	LLNL Shift Supervisor
<u>Soil Engineering Excavation Evaluation Services</u>	Mel Villegas 422-4995	
<u>Storm Drains</u>	Jon Laurant 423-1099	
<u>Structural Engineer Evaluation Services</u>	Madhu Kamath 423-7860	Mark Sampson 423-0985
<u>Technical Administration Group</u>	Bruce Fritschy 423-5677 Cell Phone 519-0967	Dennis Chew 422-8120 Cell Phone 525-5720
<u>Telecommunications</u>	Lynn Jepsen 423-7512	Jill Call 423-2773
<u>USA North</u>	1-800-227-2600	
<u>Wildlife Biologists</u>	Mike Van Hattem 424-6795	James Woollett 422-1157

### Attachment 4: Example Use of Tracer Wire, Warning Tape and Programmable Marker Balls



\* BURY THE CONNECT CORRESPONDING COLOR 3M MARKER BALL NO DEEPER THAN 6"-8" IN GROUND. IDENTIFY LOCATION ON DRAWING AND TURN INTO PERMIT DESK FOR ENTRY INTO SITE ROAD (AVAILABLE BLDG. 512). MARKER BALLS TO BE INSTALLED AT THE BEGINNING, END, TEES, OR CHANGE OF DIRECTION LOCATIONS AS PER MOP-02003

**LOCATING TRACER WIRE INSTALLATION FOR DIRECT BURIAL OF ALL NON-METALLIC PIPING SYSTEMS**

NOT TO SCALE