

## Penetration Permit

### Instructions

A penetration permit is required for all Class 2 penetrations and for those Class 1 penetrations where the hazards and controls are not documented in a job safety analysis (JSA) or similar work authorization document.<sup>1</sup>

*Class 1 penetrations* are defined as any penetration made into hollow walls, hollow ceilings, or hollow floors, or a penetration into solid materials to a depth of 2 inches or less; *Class 2 penetrations* as any deeper than 2 inches or all the way through solid materials.

All penetrations within a radiologically controlled area (RCA), a radioactive material management area (RMMA), or part of radiation shielding (for example, the Accelerator Housing Structure, End Station A Hall, Klystron Gallery Floor) require a penetration permit with the “Radiological Safety” section of the permit completed by the Radiation Protection Department in ESH. Please allow two days for Radiation Protection Department review.

In addition, a radiation safety work control form (RSWCF) is required for all penetrations that meet any of the following conditions:<sup>2</sup>

- Into or through non-concrete radiation shielding
- Into concrete radiation shielding, with penetration exceeding 2 inches in diameter
- Into concrete radiation shielding, with penetration exceeding 6 inches deep
- Into concrete radiation shielding where penetration is not refilled with a dense material (for example, concrete or steel)
- All the way through concrete radiation shielding
- Into FEH hutch roof concrete radiation shielding, with penetration exceeding 3 inches deep

Contact the area safety coordinator for more information on possible shielding concerns.

The completed penetration permit must be kept at the worksite during task. Upon completion of work send the penetration permit to the electrical safety officer, Mail Stop 84.

### Pre-planning

Workers will evaluate hazards and controls as required for the penetration work to be performed.

- Check behind walls, under floors, or through false ceilings to attempt to locate hidden utilities or other hazards (such as asbestos). In most industrial environments, electric wiring is run in metal conduit. However, it is possible for Romex cable or other soft-surfaced electrical wiring to be present within hollow walls of some buildings, especially in some portable buildings.
- Verify metal stud locations by measuring from adjacent studs or by using detection equipment to determine that the metal is not an electric conduit or gas pipe.
- If it is suspected that hidden hazards exist at the point of penetration, relocate the work if possible. If the work cannot be relocated, use non-destructive testing (NDT) devices (ground penetrating radar, x-ray, magnetic, induction, conductive, or other devices and methods) to determine whether additional hazards exist. For hollow structures a pilot hole may be useful to look for

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1 Work Planning and Control: Job Safety Analysis Form (SLAC-I-730-0A21J-034) ([pdf](#) or [Word](#)); see “[Job Safety Analysis](#)” for additional guidance.

2 Guideline 14, “Configuration Control of Radiation Safety Systems”, [SLAC Guidelines for Operations](#) (SLAC-I-010-00100-000), contact area safety coordinator for area- and system- specific forms.

hidden utilities. If the penetration is to be made into a solid load-bearing wall, use NDT before performing the penetration to ensure that it does not interrupt wall reinforcement.

- Do not use unfiltered portable vacuums to remove wallboard or concrete dust from drilling or chipping operations. Unfiltered vacuums used for wet or dry mineral dust can create dust clouds that cause false fire alarms. Before vacuuming mineral dusts or slurries, ensure that the appropriate filter is installed in the vacuum and verify that fire technicians have bypassed any local smoke detectors.

Work request number (if applicable):	Date permit submitted:
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## General Information

Area / location:	Date(s) work will be performed:	
Job description (location of penetration, material to be penetrated, tools, etc):		
Other information (depth of penetration, etc):		
Responsible line manager or designee:	Phone number:	Organization:

## Class 1 Penetration Checklist

*Hollow walls, ceilings or floors, or 2 inches or less into solid material*

	Yes	N/A
Checked other side of walls, under floors, or through false ceilings for hazards?	<input type="checkbox"/>	<input type="checkbox"/>
Verified stud locations?	<input type="checkbox"/>	<input type="checkbox"/>
Non-conductive tools to be used?	<input type="checkbox"/>	<input type="checkbox"/>
Masonry bits and hand tools to be used for initial penetration?	<input type="checkbox"/>	<input type="checkbox"/>
Drill bit stops or short drill bits (2 inches or less) to be used for solid material?	<input type="checkbox"/>	<input type="checkbox"/>
Electrical tools equipped with GFCIs or double insulated?	<input type="checkbox"/>	<input type="checkbox"/>
GFCIs tested?	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate PPE specified (see "Controls") and obtained?	<input type="checkbox"/>	<input type="checkbox"/>
PPE inspection(s) up to date?	<input type="checkbox"/>	<input type="checkbox"/>
Penetration is within a radiologically controlled area or a radioactive material management area? <i>If yes, submit to Radiation Protection to complete the "Radiological Safety" section.</i>	<input type="checkbox"/>	<input type="checkbox"/>
Penetration is part of accelerator shielding (for example, the Accelerator Housing Structure, End Station A Hall, Klystron Gallery Floor)? <i>If yes, submit to Radiation Protection to complete the "Radiological Safety" section.</i>	<input type="checkbox"/>	<input type="checkbox"/>
Penetrations that meet any of the conditions below require a radiation safety work control form (RSWCF) and approval from Radiation Physics <i>(If yes to any, submit to Radiation Protection to complete the "Radiological Safety" section.):</i>		
▪ Into or through non-concrete radiation shielding	<input type="checkbox"/>	<input type="checkbox"/>
▪ Into concrete radiation shielding, with penetration exceeding 2 inches in diameter	<input type="checkbox"/>	<input type="checkbox"/>
▪ Into concrete radiation shielding, with penetration exceeding 6 inches deep	<input type="checkbox"/>	<input type="checkbox"/>
▪ Into concrete radiation shielding where penetration is not refilled with a dense material (for example concrete or steel)	<input type="checkbox"/>	<input type="checkbox"/>
▪ All the way through concrete radiation shielding	<input type="checkbox"/>	<input type="checkbox"/>
▪ Into FEH hutch roof concrete radiation shielding, with penetration exceeding 3 inches deep	<input type="checkbox"/>	<input type="checkbox"/>
Checklist completed by:	Date:	

*Complete "Hazards and Required Controls" section.*

## Class 2 Penetration Checklist

*Greater than 2 inches into solid material*

	Yes	N/A
Reviewed historical records, engineering plans, and drawings?	<input type="checkbox"/>	<input type="checkbox"/>
Area responsible person/designee, customer/requester, or other personnel consulted?	<input type="checkbox"/>	<input type="checkbox"/>
Visually inspected proposed location of penetration?	<input type="checkbox"/>	<input type="checkbox"/>
Checked other side of walls, under floors, or through false ceilings for hazards?	<input type="checkbox"/>	<input type="checkbox"/>
De-energized and locked/tagged-out energy sources as required?	<input type="checkbox"/>	<input type="checkbox"/>
NDT used to determine if additional hazards exist? <i>If yes, list results in the "Hazards and Required Controls" section.</i>	<input type="checkbox"/>	<input type="checkbox"/>
NDT involves the use of a radiation generating device (x-ray generating device, etc.)? <i>If yes, submit to Radiation Protection to complete the "Radiological Safety" section.</i>	<input type="checkbox"/>	<input type="checkbox"/>
NDT used to determine wall reinforcement?	<input type="checkbox"/>	<input type="checkbox"/>
Electrical tools equipped with GFCI or double-insulated?	<input type="checkbox"/>	<input type="checkbox"/>
GFCIs tested?	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate PPE specified (see "Controls") and obtained?	<input type="checkbox"/>	<input type="checkbox"/>
PPE inspection(s) up to date?	<input type="checkbox"/>	<input type="checkbox"/>
Short drill bits used or equipment marked to limit penetration depth?	<input type="checkbox"/>	<input type="checkbox"/>
Penetration is within a radiologically controlled area or a radioactive material management area. <i>If yes, submit to Radiation Protection to complete the "Radiological Safety" section.</i>	<input type="checkbox"/>	<input type="checkbox"/>
Penetration is part of accelerator shielding (for example, the Accelerator Housing Structure, End Station A Hall, Klystron Gallery Floor)? <i>If yes, submit to Radiation Protection to complete the "Radiological Safety" section.</i>	<input type="checkbox"/>	<input type="checkbox"/>
Penetrations that meet any of the conditions below require a radiation safety work control form (RSWCF) and approval from Radiation Physics ( <i>If yes to any, submit to Radiation Protection to complete the "Radiological Safety" section.</i> ):		
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▪ Into concrete radiation shielding, with penetration exceeding 2 inches in diameter	<input type="checkbox"/>	<input type="checkbox"/>
▪ Into concrete radiation shielding, with penetration exceeding 6 inches deep	<input type="checkbox"/>	<input type="checkbox"/>
▪ Into concrete radiation shielding where penetration is not refilled with a dense material (for example concrete or steel)	<input type="checkbox"/>	<input type="checkbox"/>
▪ All the way through concrete radiation shielding	<input type="checkbox"/>	<input type="checkbox"/>
▪ Into FEH hutch roof concrete radiation shielding, with penetration exceeding 3 inches deep	<input type="checkbox"/>	<input type="checkbox"/>
Checklist completed by:	Date:	

*Complete "Hazards and Required Controls" section.*

## Hazards and Required Controls

*May reference JSA or area hazard analysis (AHA) if hazards / controls are documented there.*

### Hazards

Type and size of energy sources present (including results from NDT, if used):

Hazards specific to the tools that will be used:

Work environment hazards (such as moisture, lead, asbestos, etc.):

Other hazards:

### Controls

Procedural requirements:

Types and classification of PPE:

Other controls:

## Radiological Safety

*This section, if applicable, must be completed by Radiation Protection, Field Operations (RPFO). See the penetration checklist to determine if this permit requires RPFO approval. Please allow two days for review.*

Radiation Protection, Field Operations (RPFO) ext. 4299		
Pre-work survey required?	Yes <input type="checkbox"/>	N/A <input type="checkbox"/>
Radiological HEPA vacuum cleaner required?	<input type="checkbox"/>	<input type="checkbox"/>
Radiation safety work control form (RSWCF) required? <i>If yes, Radiation Physics must review (below).</i>	<input type="checkbox"/>	<input type="checkbox"/>
Additional requirements for this penetration? <i>If yes, describe:</i>	<input type="checkbox"/>	<input type="checkbox"/>
Reviewed by:	Date:	

Review of penetration permit by Radiation Protection, Radiation Physics (RPRP) <i>Required for any penetrations that require a radiation safety work control form (RSWCF)</i>	
Reviewed by:	Date:

## Review, Approval, and Authorization

*Any deviation from the scope of work identified on this permit requires revalidation of this permit. This penetration permit expires 30 days after issuance.*

### Class 1 and 2 Authorizations

I have discussed the hazards and controls with the workers and verified that they are trained / qualified to perform the work.	
Responsible line manager / designee:	Date:

### Additional Authorization for Class 2

Area responsible person (area or building manager):	Date:
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