



# **Radiological Worker — Practical Factors**

## **[FN000471/OJ/01]**

Environment, Safety & Health Section

Revised February 2021

# Course Objective and What We Are Doing Today

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Objective: Provide an opportunity for hands-on activities so that radiological workers can demonstrate practical knowledge in a simulated, controlled work environment. These hands-on exercises are required by Title 10, Code of Federal Regulations (CFR), Part 835, *Occupational Radiation Protection Program*.

Today we will:

- Review Radiological Work Permits (RWPs), dosimetry, survey instruments, and protective clothing (PPE)
- Personnel frisking
- Frisking to identify radioactive materials, surveying radioactive material with a Wallflower, and labeling radioactive material

Upon completion of this training, you will be a qualified radiological worker. You will be qualified to work on, with, or in the proximity of the Fermilab accelerator, other radiation producing machines, and use radioactive material.

Willful violation of environment, safety and health procedures or policies may result in disciplinary action up to and including termination for employees and denial of the use of Fermilab facilities for experimenters.



# Radiological Work Permits (RWPs)

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- Radiological Work Permits are the primary documents at Fermilab that specify requirements for performing radiological work in radiological areas or for working with radioactive materials.
- **NOTICE:** RWPS ONLY address radiological hazards, not ALL workplace hazards.
- See your Division Safety Officer or supervisor for instructions or questions about Hazard Analysis or other permits/work planning tools that may be necessary for your work.
- READ all fields and follow requirements.
- RWPs may have more than one page.
- RWPs are tailored to individual beam enclosures, work area and work being performed.
- Sign RWP Sign-In Sheet or sign actual RWP if applicable.

# Radiological Work Permits (RWPs)

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- There are two types of RWPs: General (routine or repetitive work, one year duration) and Job-Specific (one-time, limited duration work)
  - Where are General RWPs located?
    - For beam enclosures: where one gets the Enter key:
      - Main Control Room or near Remote Key Trees
      - Access and Sign Electronically
        - ✓ Confirm that you have a Services account
        - ✓ Go to the ESH at Work website: <https://eshq.fnal.gov/atwork/> or AD Operations page: <https://operations.fnal.gov/> then click on “Online RWPs – New!”
        - ✓ Click on the “Read & Sign General Enclosure RWPs” link in the “Stay Safe” menu on the right-hand side: <https://esh-rwp.fnal.gov/>
        - ✓ For questions on accessing and signing electronic RWPs, contact your assigned RSO or go to <https://esh-docdb.fnal.gov/cgi-bin/sso/ShowDocument?docid=5696>
    - Elsewhere: at work location as distributed by the RSOs
  - Job-Specific RWPs are usually posted at job-site or are with the RCT.
  - Signatures are required at start of work unless otherwise instructed by RSO.

# RWP General Hazards Update

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- As a result of an assessment, all general hazard information has been removed from RWPs. RWPs will only have radiological hazards, controls, mitigations, restrictions, and requirements.
- The general hazard information for enclosures is now in the **“Enclosure Hazard Specifications Sheet”**. This sheet will be placed in **“Enclosure Access Binders”** as the first page within the plastic sleeve. The RWP will be moved to the backside of the plastic sleeve.
- The newly created website for reading and signing Supervised Access RWPs has been updated to have a similar format. A new column has been added to view the separate Enclosure Hazard Specifications Sheet through a separate link. Viewing and signing the RWP will remain the same.

# Enclosure Access Binder Documents - Example



Enclosure Hazards Specification

## TeV A-E Enclosures

### Basic Entry Requirements

|   |   |   |   |
|---|---|---|---|
|  |  |  |  |
| No eating, drinking, smoking, applying cosmetics/lip balm                         | One key per person  | Two-person rule   | Long pants, shirt with sleeves & closed toe shoes required                        |

### Hazards and Requirements

|   |   |
|---|---|
|  |  |
| Radiological – see general entry RWP  | Low/poor lighting conditions – bring flashlight or supplemental lighting          |

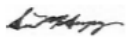
Fermilab National Accelerator Laboratory 1/2021

|  |  |                 |              |
|--|--|-----------------|--------------|
| <b>Fermilab</b>                        |  | Permit Type     | General      |
| Radiological Work Permit No. AD-21-047 |  | Issue Date      | Jan 21, 2021 |
| Area Name                              |  | Issue Time      | 1:43 PM      |
| <b>TeVatron A-E Sectors</b>            |  | Expiration Date | Jan 31, 2022 |

|   |   |   |
|---|---|---|
| <b>Description of Work</b><br>All work, tours, and inspections <b>EXCEPT FOR:</b><br>1. Cutting, drilling, or grinding on radioactive material<br>2. Work in areas posted as High Radiation and/or Contamination areas<br>3. Work on beam pipes and magnet interface areas. See "Special Requirements."   |   | <b>Access Type</b><br><input type="radio"/> Controlled Access<br><input checked="" type="radio"/> Supervised Access<br><input type="radio"/> Open Access<br><input type="radio"/> Other - Secured Area<br><input type="radio"/> N/A   |
| <b>Basic Work Area Conditions</b><br>See Enclosure Hazards Specification Sheet  | <b>Additional Work Area Conditions</b><br>None  | <b>Area Posting</b><br>Controlled Area<br><br>Radioactive Material Area   |
| <b>Time Limits</b><br>None  | <b>Dose Limits</b><br>100 mrem per week and 1500 mrem per year are administrative control limits  | <b>Work Documents</b><br>Job-specific HAs as applicable, see supervisor or DSO  |
| <b>Dosimetry Requirements</b><br><input type="checkbox"/> None Required<br><input checked="" type="checkbox"/> Dosimetry Badge<br><input checked="" type="checkbox"/> Pocket Dosimeter<br><input type="checkbox"/> Ring Badge<br><input type="checkbox"/> Digidose<br><input type="checkbox"/> See Special Requirements   | <b>Basic Training Requirements</b><br>Radiological Worker   | <b>Other Training Requirements</b><br>None  |
| <b>Portable Survey Instruments</b><br><input checked="" type="checkbox"/> None Required<br><input type="checkbox"/> LSM<br><input type="checkbox"/> Ludlum 14C<br><input type="checkbox"/> E140N/Portable Frisker<br><input type="checkbox"/> Minimeter<br><input type="checkbox"/> Teletector<br><input type="checkbox"/> Bicon Analyst<br><input type="checkbox"/> See Special Requirements | <b>Minimum Personal Protective Equipment</b><br><input checked="" type="checkbox"/> None Required<br><input type="checkbox"/> Gloves<br><input type="checkbox"/> Shoe covers<br><input type="checkbox"/> Labcoats<br><input type="checkbox"/> Coveralls<br><input type="checkbox"/> Hood<br><input type="checkbox"/> Eye Protection<br><input type="checkbox"/> Respiratory Protection<br><input type="checkbox"/> See attached instructions<br><input type="checkbox"/> See special requirements | <b>Additional Instructions</b><br><input type="checkbox"/> Notify ESH&Q Prior to Work<br><input type="checkbox"/> Rad Tech Coverage Required<br><input checked="" type="checkbox"/> Review Survey Map<br><input type="checkbox"/> Pre-Job Briefing<br><input checked="" type="checkbox"/> Personal Frisk on Exit<br><input checked="" type="checkbox"/> Survey & Label Materials on Exit<br><input type="checkbox"/> Post-Job De-Briefing<br><input checked="" type="checkbox"/> No Eating, Drinking, Smoking<br><input checked="" type="checkbox"/> See Special Requirements |

**SPECIAL REQUIREMENTS**  
 Contact MCR to request RSO approval *prior* to working in any posted High Radiation (100 mrem/hr or greater) and/or Contamination Areas. There is always a potential for contamination on beam pipes and in magnet interface areas, therefore before removing any material from such areas, contact Radiation Safety for additional guidance.





|                             |                   |   |
|-----------------------------|-------------------|---|
| Prepared By Susan McGimpsey | RSO Authorization |  |
|-----------------------------|-------------------|---|

# Enclosure Access Binder Documents - Example




Enclosure Hazards Specification


## SY F2, F3 Manholes

### Basic Entry Requirements

|   |   |   |   |
|---|---|---|---|
|  |  |  |  |
| No eating, drinking, smoking, applying cosmetics/lip balm                         | One key per person  | Two-person rule   | Long pants, shirt with sleeves & closed toe shoes required                        |

### Hazards and Requirements

|   |   |   |
|---|---|---|
|  |  |          |
| Radiological – see general entry RWP  | Low-hanging equipment – bump cap or hard hat required                             | Confined Space – Confined Space training [FN000003], Confined Space Entry Permit Required |

|  |  |  |              |
|--|--|--|--------------|
| <b>Fermilab</b>  |  | Permit Type  | General      |
| Radiological Work Permit No. AD-21-018   |  | Issue Date   | Jan 20, 2021 |
| Area Name  |  | Issue Time   | 2:09 PM      |
| SY F2, F3 Encl.  |  | Expiration Date  | Jan 31, 2022 |
| <b>Description of Work</b><br>All work, tours, and inspections <b>EXCEPT FOR:</b><br>1. Cutting, drilling, or grinding on radioactive material<br>2. Removal of materials from Magnet interface areas, or areas where dose rates are greater than 20 mR/hr at 1'. See "Special Requirements."<br>3. Areas reading greater than 100 mrem/hr at 1', or posted as High Radiation and/or Contamination Areas |  | <b>Access Type</b><br><input checked="" type="radio"/> Controlled Access<br><input type="radio"/> Supervised Access<br><input type="radio"/> Open Access<br><input type="radio"/> Other - Secured Area<br><input type="radio"/> N/A  |              |
| <b>Basic Work Area Conditions</b><br>See Enclosure Hazards Specification Sheet   | <b>Additional Work Area Conditions</b>   | <b>Area Posting</b><br>Radiation Area  |              |
| <b>Time Limits</b><br>None   | <b>Dose Limits</b><br>100 mrem per week and 1500 mrem per year are administrative control limits   | <b>Work Documents</b><br>Job-specific HAs as applicable, see supervisor or DSO   |              |
| <b>Dosimetry Requirements</b><br><input type="checkbox"/> None Required<br><input checked="" type="checkbox"/> Dosimetry Badge<br><input checked="" type="checkbox"/> Pocket Dosimeter<br><input type="checkbox"/> Ring Badge<br><input type="checkbox"/> Digidose<br><input type="checkbox"/> See Special Requirements  | <b>Basic Training Requirements</b><br>Radiological Worker<br>Controlled Access   | <b>Other Training Requirements</b>   |              |
| <b>Portable Survey Instruments</b><br><input type="checkbox"/> None Required<br><input checked="" type="checkbox"/> LSM<br><input type="checkbox"/> Ludlum 14C<br><input type="checkbox"/> E140N/Portable Frisker<br><input type="checkbox"/> Minimeter<br><input type="checkbox"/> Teletector<br><input type="checkbox"/> Bicon Analyst<br><input type="checkbox"/> See Special Requirements            | <b>Minimum Personal Protective Equipment</b><br><input type="checkbox"/> None Required<br><input checked="" type="checkbox"/> Gloves<br><input checked="" type="checkbox"/> Shoecovers<br><input type="checkbox"/> Labcoats<br><input type="checkbox"/> Coveralls<br><input type="checkbox"/> Hood<br><input type="checkbox"/> Eye Protection<br><input type="checkbox"/> Respiratory Protection<br><input checked="" type="checkbox"/> See attached instructions<br><input type="checkbox"/> See special requirements | <b>Additional Instructions</b><br><input type="checkbox"/> Notify ESH&Q Prior to Work<br><input type="checkbox"/> Rad Tech Coverage Required<br><input type="checkbox"/> Review Survey Map<br><input type="checkbox"/> Pre-Job Briefing<br><input checked="" type="checkbox"/> Personal Frisk on Exit<br><input checked="" type="checkbox"/> Survey & Label Materials on Exit<br><input type="checkbox"/> Post-Job De-Briefing<br><input checked="" type="checkbox"/> No Eating, Drinking, Smoking<br><input checked="" type="checkbox"/> See Special Requirements |              |
| <b>SPECIAL REQUIREMENTS</b><br>Prior RSO approval is required before working in a posted High Radiation or Contamination Area. If dose rates exceed 500mR/hr at 1', turn back, and notify the MCR. Contact MCR to request Rad Safety guidance before removing components from magnet interface areas or areas where dose rates exceed 20 mR/hr at 1'.  |  |  |              |
| Prepared By Susan McGimpsey  |  | RSO Authorization   |              |

Fermi National Accelerator Laboratory

1/2021

# Enclosure Hazards Specification Sheet – Possible Hazards

## Possible Hazards |

|  |  |  |   |
|--|--|--|---|
|   |       |                         |                    |
| Radiological – see general entry RWP   | Group Lock-Out Tag-Out Box – place LOTO lock on <del>xxxx</del> box located in the MCR | Overhead Loads Possible – hard hat required  | Low-hanging equipment – bump cap or hard hat required   |
|   |       | <br>ASPHYXIATION HAZARD | <br>CONFINED SPACE |
| Lasers Present – <del>xxx</del> required   | Magnetic Field – <del>xxx</del> required   | ODH – ODH training [FN000029], oxygen monitor and/or escape pack required                                  | Confined Space – Confined Space training [FN000003], Confined Space Entry Permit Required             |
|  |  |  |   |
| Low/poor lighting conditions – bring flashlight or supplemental lighting           | Other  |  |   |




# Radiological Work Permits (RWPs)

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- Two General RWP examples follow: **Supervised Access** (interlocks, dropped, area survey completed, usually in shutdown mode) and **Controlled Access** (interlocks not dropped, survey not completed).

# RWP – Supervised Access Example

|  |   |  |   |                               |
|--|---|--|---|-------------------------------|
| <b>Fermilab</b>  |   | <b>Division: AD</b>  | <b>Permit Type</b>  | General                       |
| <b>Radiological Work Permit No. AD-21-040</b>  |   |  | <b>Issue Date</b>   | Jan 21, 2021                  |
| <b>Area Name</b>   | <b>RWP State</b>  |  | <b>Issue Time</b>   | 1:17 PM                       |
| MeV Test Area (MTA)  |   |  | <b>Expiration Date</b>  | Jan 31, 2022                  |
| <b>Description of Work</b>   |   |  | <b>Access Type</b>  |                               |
| All work, tours, and inspections <b>EXCEPT FOR:</b>  |   |  | <input type="radio"/> Controlled Access<br><input checked="" type="radio"/> Supervised Access<br><input type="radio"/> Open Access<br><input type="radio"/> Other - Secured Area<br><input type="radio"/> N/A |                               |
| 1. Cutting, drilling, or grinding on radioactive material<br>2. Work in areas posted as High Radiation and/or Contamination areas<br>3. Disassembling solenoid, work on collimators, beam pipes and magnet interface areas. See "Special Requirements."<br>4. No handling radioactive materials in the ITA cave or "front porch" |   |  |   |                               |
| <b>Basic Work Area Conditions</b>  |   | <b>Additional Work Area Conditions</b>                                     |   |                               |
| See Enclosure Hazards Specification Sheet  |   |  |   |                               |
| <b>Time Limits</b>   | Getting close to the weekly dose limit?  | <b>Dose Limits</b>   |   | <b>Area Posting</b>           |
| None   |   | 100 mrem per week and 1500 mrem per year are administrative control limits |   | 1. Radiation Area<br>2.<br>3. |
|  |   |  | <b>Work Documents</b>   |                               |
|  |   |  | Job-specific HAs as applicable, see supervisor or DSO   |                               |

# RWP – Supervised Access Example

## Dosimetry Requirements

- None Required
- Dosimetry Badge
- Pocket Dosimeter
- Ring Badge
- Digidose
- See Special Requirements

## Basic Training Requirements

Radiological Worker

## Other Training Requirements

## Portable Survey Instruments

- None Required
- LSM
- Ludlum 14C
- E140N/Portable Frisker
- Minimeter
- Teletector
- Bicon Analyst
- See Special Requirements

## Minimum Personal Protective Equipment

- None Required
- Gloves
- Shoecovers
- Labcoats
- Coveralls
- Hood
- Eye Protection
- Respiratory Protection
- See attached instructions
- See special requirements

## Additional Instructions

- Notify ESH&Q Prior to Work
- Rad Tech Coverage Required
- Review Survey Map
- Pre-Job Briefing
- Personal Frisk on Exit
- Survey & Label Materials on Exit
- Post-Job De-Briefing
- No Eating, Drinking, Smoking
- See Special Requirements

## **SPECIAL REQUIREMENTS**

*There is always a potential for contamination on beampipes and in magnet interface areas, therefore before removing any material from such areas, contact RSO for additional guidance.*

Prepared By Susan McGimpsey

RSO Authorization

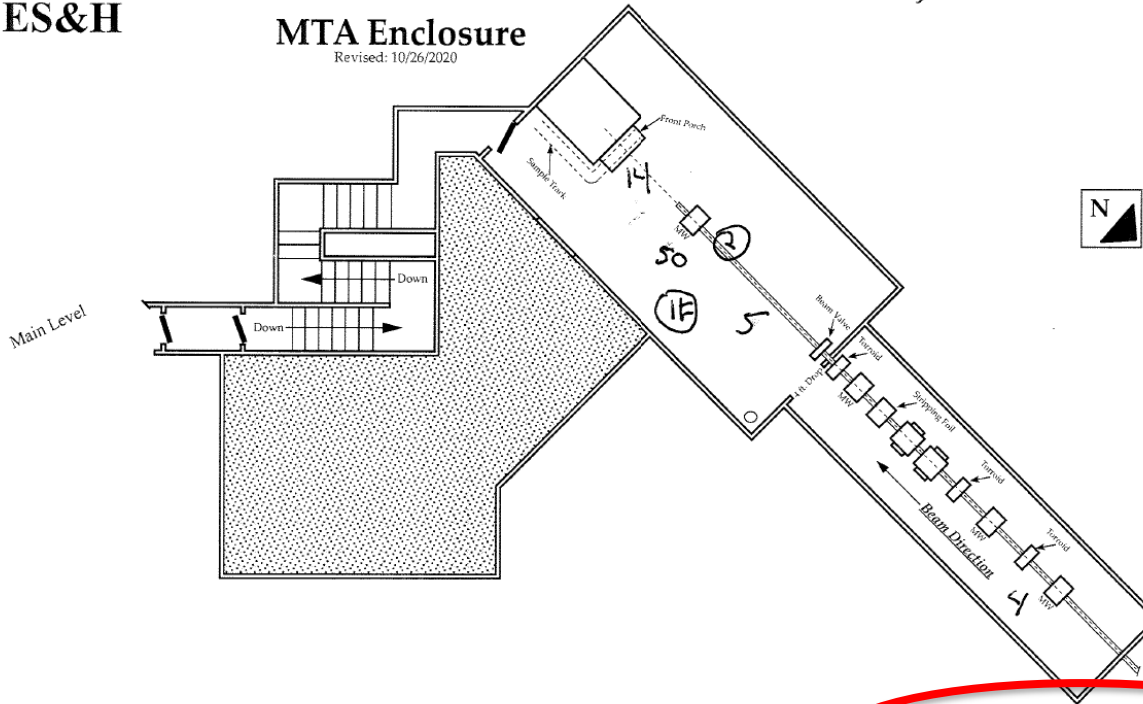


# RWP – Supervised Access Example – Survey Map



DATE: 1/29/21 TIME: 0730 PURPOSE: initial opening RWP # AO-21-040

MTA Enclosure  
Revised: 10/26/2020



|   |                               |  |   |
|---|-------------------------------|--|---|
| Beam Off Date: <u>1/27/21</u>   | Beam Off Time: <u>9:20 PM</u> | Intensity: <u>4.67E12</u>  | <b>Highest Dose Rate Found: <u>50</u> mR/hr @ 1foot</b> |
| Radiation Instruments Used  |                               |  |   |
| Inst Type: <u>nm</u>  | <u>Fisher</u>                 |  |   |
| Inst No: <u>5</u>   | <u>97</u>                     |  |   |
| Batt/Source Enk: <u>SAI</u>   | <u>SAI</u>                    |  |   |
| Cal. Due Date: <u>2/21</u>  | <u>8/21</u>                   |  |   |
| <b>All Areas &lt; <u>4</u> mR/hr@1foot (Unless otherwise indicated)</b>   |                               |  |   |
| LEGEND: Numbers appearing on map are mR/hr @ 1 ft readings unless denoted with symbols below. * = mR/hr @ contact |                               |  |   |
| A = Air Sample  | ⊙ = Wipe                      | ⊙ = Floor wipe   |   |
| Bkgd <u>1200</u> cpm  |                               | Comments: <u>Wipes need to be taken on samples, on the porch and on the floor around the cave.</u> |   |
| Wipe: Reading   | Wipe: Reading                 | Surveyed By: <u>Russ Sedory</u>  |   |
| <u>1</u> <u>0</u> ccpm  | _____ ccpm                    | Reviewed By: <u>[Signature]</u>  |   |
| <u>2</u> <u>0</u> ccpm  | _____ ccpm                    |  |   |
| _____ ccpm  | _____ ccpm                    |  |   |
| _____ ccpm  | _____ ccpm                    |  |   |
| _____ ccpm  | _____ ccpm                    |  |   |

Opening Up Enclosure Survey Form - R. P. Form # 111

Revised 1/30/19



# RWP – Supervised Access Example – Signature Page

**MTA**  
Supervised Access  
RWP Sign-In Sheet

RWP Number: AD-21-040  
Survey Date: 1/29/2021  
RSO: Sue McGimpsey

By signing the last column below, I agree to follow all RWP requirements.

| ID Number | Print Name | Date | Job Description | PPE Level | Signature |
|-----------|------------|------|-----------------|-----------|-----------|
|           |            |      |                 | SEE HA    |           |
|           |            |      |                 | SEE HA    |           |
|           |            |      |                 | SEE HA    |           |
|           |            |      |                 | SEE HA    |           |
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|           |            |      |                 | SEE HA    |           |
|           |            |      |                 | SEE HA    |           |

*Do not write on back of page or in page margins. If more sign-in sheets are needed, contact assigned RSO via MCR (x3721).*

**RWPs for Supervised Access need to be signed once per supervised access period.**



# RWP – Controlled Access Example

|   |  |  |              |
|---|--|--|--------------|
| <b>Fermilab</b>   | <b>Division: AD</b>  | <b>Permit Type</b>   | General      |
| <b>Radiological Work Permit No. AD-21-011</b>   |  | <b>Issue Date</b>  | Jan 20, 2021 |
| <b>Area Name</b>  | <b>RWP State</b>   | <b>Issue Time</b>  | 1:44 PM      |
| Main Injector MI-20 -- MI-62  |  | <b>Expiration Date</b>   | Jan 31, 2022 |
| <b>Description of Work</b>  |  | <b>Access Type</b>   |              |
| All work, tours, and inspections <b>EXCEPT FOR:</b>   |  | <input checked="" type="radio"/> <i>Controlled Access</i>      |              |
| 1. Cutting, drilling, or grinding on radioactive material   |  | <input type="radio"/> <i>Supervised Access</i>                 |              |
| 2. Removal of materials from Magnet interface areas, or areas where dose rates are greater than 20 mR/hr at 1'. See "Special Requirements." |  | <input type="radio"/> <i>Open Access</i>                       |              |
| 3. Areas reading greater than 100 mrem/hr at 1', or posted as High Radiation and/or Contamination Areas                                     |  | <input type="radio"/> <i>Other - Secured Area</i>              |              |
|   |  | <input type="radio"/> <i>N/A</i>                               |              |
| <b>Basic Work Area Conditions</b>   | <b>Additional Work Area Conditions</b>                                     | <b>Area Posting</b>  |              |
| See Enclosure Hazards Specification Sheet   | Contamination Areas: Levels of Be-7 may not be detectable with Frisker     | 1. Radiation Area: All Enclosure                               |              |
|   |  | 2. High Radiation Area: MI 230 -304;307-313; MI40 Absorber Rm  |              |
|   |  | 3. Contamination Area: MI 230-304, 307-313; MI40 Absorber Room |              |
| <b>Time Limits</b>  | <b>Dose Limits</b>   | <b>Work Documents</b>  |              |
| None  | 100 mrem per week and 1500 mrem per year are administrative control limits | Job-specific HAs as applicable, see supervisor or DSO          |              |

Getting close to the weekly dose limit?



# RWP – Controlled Access Example

## Dosimetry Requirements

- None Required
- Dosimetry Badge
- Pocket Dosimeter
- Ring Badge
- Digidose
- See Special Requirements

## Basic Training Requirements

Radiological Worker  
Controlled Access

## Other Training Requirements

## Portable Survey Instruments

- None Required
- LSM
- Ludlum 14C
- E140N/Portable Frisker
- Minimeter
- Teletector
- Bicron Analyst
- See Special Requirements

## Minimum Personal Protective Equipment

- None Required
- Gloves
- Shoecovers
- Labcoats
- Coveralls
- Hood
- Eye Protection
- Respiratory Protection
- See attached instructions
- See special requirements

## Additional Instructions

- Notify ESH&Q Prior to Work
- Rad Tech Coverage Required
- Review Survey Map
- Pre-Job Briefing
- Personal Frisk on Exit
- Survey & Label Materials on Exit
- Post-Job De-Briefing
- No Eating, Drinking, Smoking
- See Special Requirements

## SPECIAL REQUIREMENTS

*Prior RSO approval is required before working in a posted High Radiation or Contamination Area. If dose rates exceed 500mR/hr at 1', turn back, and notify the MCR. Contact MCR to request Rad Safety guidance before removing components from magnet interface areas or areas where dose rates exceed 20 mR/hr at 1'.*

***Double shoe covers and double gloves required in the posted Contamination Area. RSO approval required to walk/work in standing water. Work in standing water, rubber boots must also be worn. PPE worn inside of the posted Contamination Area must be discarded as rad waste. No carts through posted Contamination Area, see local postings. RCT coverage required for entry into MI-40 absorber room.***

Prepared By Susan McGimpsey

RSO Authorization



# RWP - Controlled Access - Protective Clothing (PPE)

## Controlled Access Protective Clothing Requirements

| TYPE OF WORK  | PROTECTIVE CLOTHING REQUIRED   |
|---|--|
| <b>LEVEL 1:</b> Personnel will just walk and look. No climbing, crawling, <u>leaning onto or close to</u> , kneeling, or working on potentially contaminated surfaces:                          | *Shoe covers and gloves.   |
| <b>LEVEL 2:</b> Personnel will perform <u>any</u> type of work that includes leaning close to, leaning onto, or touching potentially contaminated surfaces. No climbing, crawling, or kneeling: | *Lab coat, shoe covers, and gloves.<br><br>*Also wear hood if it is likely that your head or hair may touch a potentially contaminated surface.  |
| <b>LEVEL 3:</b> Personnel will perform <u>any</u> type of work that likely involves climbing, crawling, or kneeling:  | *Coveralls, shoe covers, and gloves.<br><br>*Also wear hood if it is likely that your head or hair may touch a potentially contaminated surface.   |
| <b>LEVEL 4:</b> Electrical work with potential arc-flash hazard or welding:   | *The standard PPE used for radiological contamination is flammable. When job tasks require PPE for NFPA 70E or for welding, the PPE required for arc-flash protection or welding takes precedence over PPE for radiological contamination concerns. Tyvek suits, coveralls, shoe covers, and gloves shall NOT be worn. |



# RWP – Controlled Access – Signature Page

MI-20--MI-62

Controlled Access

RWP Sign-In Sheet

RWP Number: AD-21-011  
Key Barcode Range: 1521-1565  
RSO: Sue McGimpsey

By signing the last column below, I agree to follow all RWP requirements.

| ID Number | Print Name | Date | Job Description | Key Barcode # | PPE Level | Signature |
|-----------|------------|------|-----------------|---------------|-----------|-----------|
|           |            |      |                 |               |           |           |
|           |            |      |                 |               |           |           |
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|           |            |      |                 |               |           |           |
|           |            |      |                 |               |           |           |

*Do not write on back of page or in page margins. If more sign-in sheets are needed, contact assigned RSO via MCR (x3721).*

1. RWPs for Controlled Access need to be signed for each access every time you obtain a key, even in the same day because radiological conditions may change.
2. Before the access, all members making an access must verify that everyone on the access has the correct Enter key.
3. Log your Enter Key 4 digit bar code number.

## RWP - Controlled Access - Survey Instruments

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- Log Survey Meters (LSMs) are needed for Controlled Access, since area has not been surveyed. First person entering enclosure on Controlled Access should use the LSM.
- Use of the LSM is covered in Controlled Access Training.
- Other instruments are mainly used by Radiation Safety staff.
- If an instrument is specified on the RWP, ask about it!
- Return all instruments to where you checked them out.
- Take care of instruments, they are expensive!

# Dosimetry Badges

- Dosimetry badges are your legal record of radiation exposure at Fermilab.
- Never open or tamper with dosimetry badges.
- Never take dosimetry badges off-site.
- Never write on or cover up the numbers or QR codes on the front of the badge.
- Badges must be worn facing forward on the torso, on or between the waist and neck.
- Badges must be worn at all times when required by signs, RWPs, and/or radiological control personnel.
- If dosimetry becomes lost, damaged, or potentially contaminated:
  - Put work in a safe condition.
  - Alert others in the vicinity.
  - Immediately exit the area.
  - Notify the assigned RSO or other Radiation Safety staff.



# Dosimetry Badges

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- To obtain a dosimetry badge:
  - Temporary dosimetry badges are available 24/7 from the Security Operations Center on the ground floor of Wilson Hall.
  - If you will need dosimetry on an ongoing basis, contact your assigned RSO and request to go on permanent badge service. A badge with your name printed on it will be delivered to your work area each quarter.
- At the start of each quarter (Jan 1<sup>st</sup>, Apr 1<sup>st</sup>, Jul 1<sup>st</sup>, Oct 1<sup>st</sup>), your dosimetry badge must be returned, and a new badge obtained for use in the new quarter.
  - You may return your badge at any time if you are leaving the lab.
- Dosimetry badges may be returned by:
  - putting them in the drop box on the ground floor of WH, next to the ATM.
  - giving them to your assigned RSO.
  - mailing them to Dosimetry at MS 119.
  - placing them on any badge rack with other badges of the same quarter/color.
- Questions about dosimetry? Contact [dosimetry@fnal.gov](mailto:dosimetry@fnal.gov).

## Pocket Dosimeters (Supplemental Dosimetry)



- Direct reading pocket dosimeter-  
measures radiation exposure during  
work in real time.
- Used as a back-up for the dosimetry badge in case it is lost.
- You may obtain pocket dosimeters from the stockroom.
- Wear pocket dosimeters next to dosimetry badge, normally on the trunk of the body.
- Return the dosimeter to stockroom when it is due for calibration, on the last day of the month indicated by the sticker.

# Pocket Dosimeters (Supplemental Dosimetry)

- Mechanical shocks, such as dropping the dosimeter, can cause needle to move resulting in a false high or full-scale reading.
- Read the dosimeter at the same orientation; needle is sensitive to gravity!
- Pocket dosimeters should be zeroed when you reach  $\geq 50\%$  of the full scale.

## Charging Pocket Dosimeter:

- Push pocket dosimeter down on the lighted charger port. Use some force and hold in place.
- Use knob on right to zero needle. Don't be too fussy about getting the initial reading "exactly" zeroed, a few mR is ok, just remember or write down the number.



# Recording Pocket Dosimeter Readings

Preferred Method: Use Online **GetDose** system

- Tracks **only** pocket dosimeter doses.
- As a radiological worker, you will receive weekly emails on Mondays reminding you to enter pocket dosimeter readings.
- If you wore a pocket dosimeter and received no dose for the week, it is important to enter **zero** to accurately track your dose.
- If you did not wear a pocket dosimeter during the week, you may delete/ignore the weekly email.
- **Some groups still use 3x5 cards; fill out, turn in to Supervisor.**

**GetDose Entry Form**

|   |   |
|---|---|
| UserName  | maddiew   |
| Dept.   | Environment, Safety, Health And Quality Section, Radiation Protection |
| Email   | maddiew@fnal.gov  |
| Dose for Last Week  | <input type="text" value="10"/> (mr)                                  |
| <input type="button" value="Submit Data"/>  |   |
| <small>n/r means "No record". Submitting a number, zero included, indicates a valid report.</small> |   |

# Protective Clothing (PPE)

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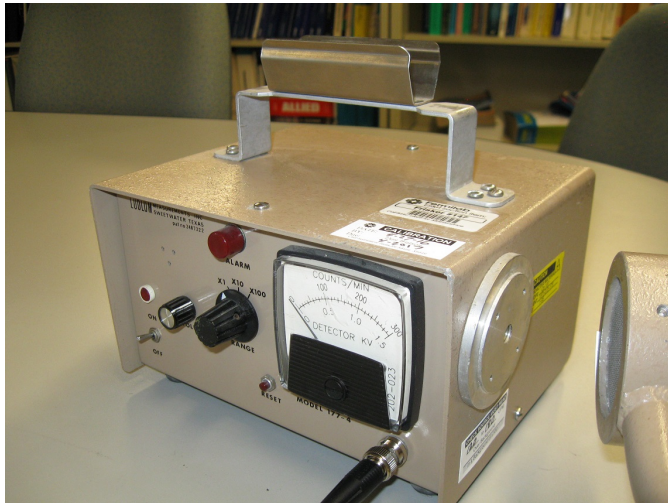
- Generally, protective clothing is required for Controlled Accesses and for areas of potential contamination.
- Sometimes used in work supervised by RCTs.
- Check for rips, tears, and holes.
- There is no specified order for donning.
- **Wear dosimetry badge and pocket dosimeter (or other supplemental dosimetry) on the outside of protective clothing.**
- Remove protective clothing from head to feet, then remove gloves last:
  1. Hood
  2. Lab coat or coveralls : Pull off backwards and roll up inside out to wrap up any removable contamination.
  3. Shoe covers - Roll up inside out.
  4. Gloves last - Roll up inside out.



# Frisker Instrument

There are two uses for the Frisker instrument:

1. Personnel frisk to check if you are contaminated with removable radioactivity.
2. Determine if objects being removed from a beam enclosure are radioactive.
3. We have two models, line powered (plugged in) and another portable battery powered Frisker.
4. Please do not touch knobs on back of wall-powered Frisker!



# Personnel Frisking to Check for Contamination

- Look for damage, bad cables, then verify that Frisker is turned on (red light will be lit)
- Verify calibration due date, report and do not use if expired.
- Check background. Background reading of a Frisker is generally between 30 cpm and 80 cpm.
- Check that probe is pointing up.
- First person to use instrument should conduct a source check with probe.
- First person should hand probe face up to the next person.



# Personnel Frisking to Check for Contamination

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- Check hands (gloves if wearing PPE), no more than 2 inches (5 cm) per second, with the probe  $\frac{1}{4}$  inch (6 mm) away. Stay close and go slow!
- Overlap within the probe's width, about 2 inches (5 cm).
- At a minimum:
  - Frisk hands (front & back)
  - Frisk shoes (bottom, top, and sides)
- Check other body parts that touched something.
  - Check knees if you have been kneeling,
  - Seat of the pants if sitting on something,
  - Elbows if leaning on some equipment item.
- Also check personal items such as hardhats, notebooks, papers, flashlights, etc.


## Frisking Your Protective Clothing for Removable Radioactivity

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- Listen/watch the count rate, don't stop if it goes into alarm, you need the actual reading. Again, go slow and overlap within width of probe.
- If all readings are less than 50 cpm above background:
  - The PPE can be disposed of as ordinary trash.
  - The frisk is complete.
- If more than **50 cpm above background** is found on any item of your protective clothing, all protective clothing is considered contaminated. In this case:
  - Dispose of all protective clothing items as radioactive waste in radioactive waste container. Do not try to separate out “clean” from contaminated items.
  - Notify Main Control Room at x3721 or Radiation Safety.

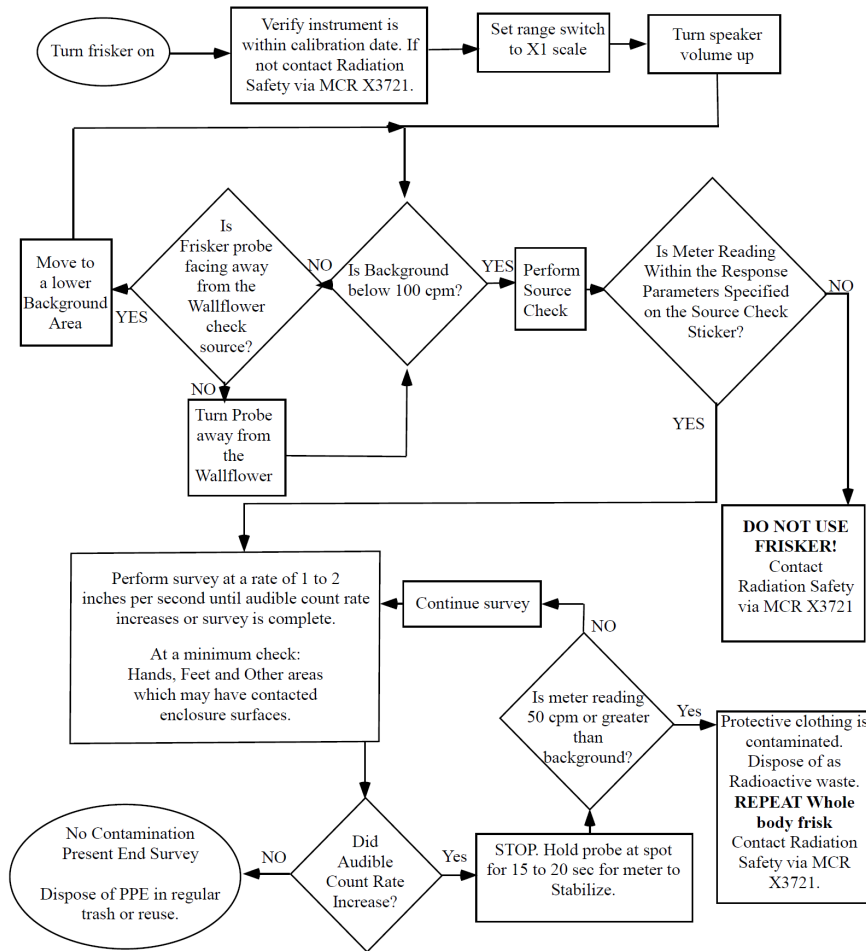
# Frisking Your Street Clothes and Your Person

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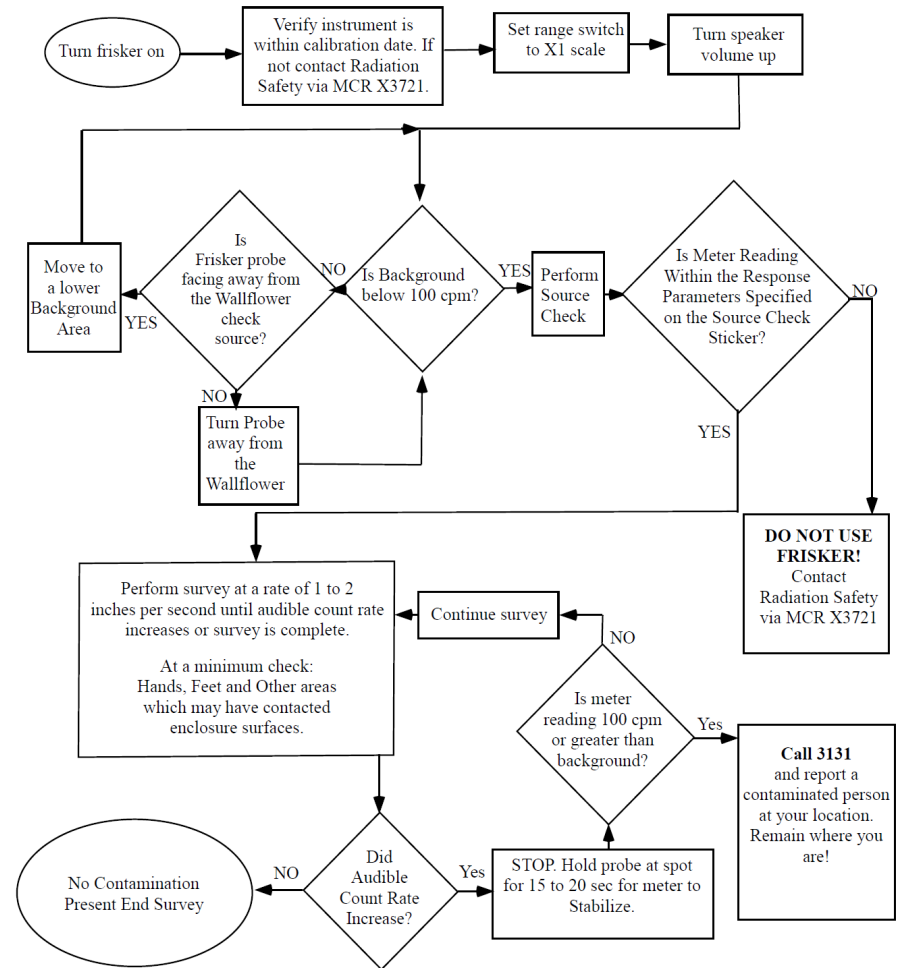
- Proceed to frisk your person and your street clothes after protective clothing is removed.
- **If more than 100 cpm above background** on your person, you are possibly contaminated.
  - Many times, it is radon daughter products and will decay away by itself within about 30 minutes.
  - Contamination many result from dust, dirt, grease, or water.
  - Call x3131, Radiation Safety and/or the Fire Department will respond.
  -  – Do not attempt to decontaminate yourself. Wait for a response to your call!
  - Most of the time, soap and water will decontaminate skin. Duct tape or masking tape will remove contamination from street clothes. There is an onsite decontamination facility if needed.
  - Radiation Safety staff will check for this and advise.

# Flowcharts: Frisking

**Frisker Procedure for Personnel Monitoring when Wearing Protective Clothing**



**Frisker Procedure for Personnel Monitoring when Not Wearing Protective Clothing**



# Surveying Materials for Radioactivity

Two instruments are used:

First, use the FRISKER to identify items as radioactive.

Second, use the WALLFLOWER to classify items found to be radioactive with the FRISKER.




Frisker

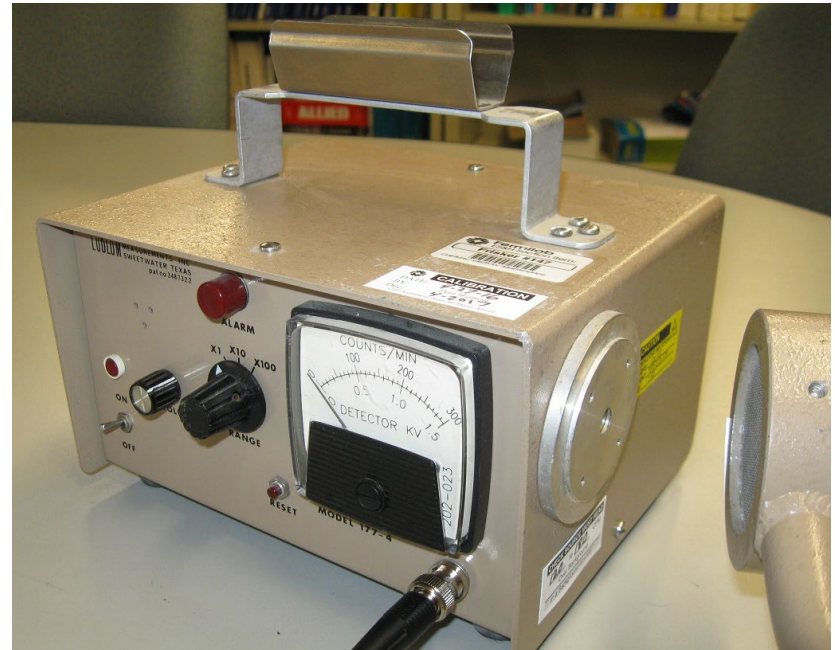


Wallflower

# Use Frisker to Survey Materials for Radioactivity

**First:** Use Frisker to check all surfaces and edges with the probe at ¼ inch (6 mm) away.

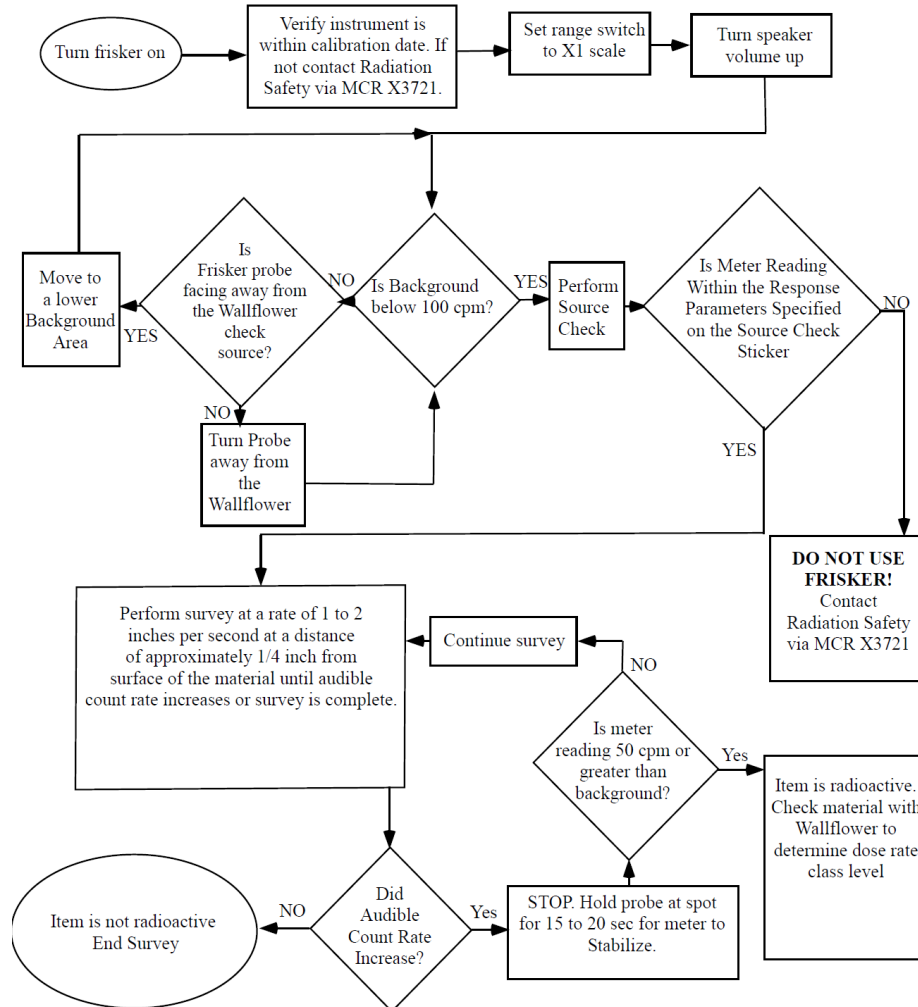
- If item measures greater than **50 cpm above background**, then it is radioactive and at least **Class 1**. 
- If not greater 50 cpm above background, the item is not radioactive. Survey is complete.





# Flowchart: Identifying Radioactive Materials with Frisker

## Frisker Procedure for Monitoring Materials



# Use Wallflower to Classify Radioactive Materials

**Second:** Use the **Wallflower** to classify radioactive items.

- All items surveyed on the Wallflower are **AT LEAST** Class 1.
- Check that the power is on.



- Verify that instrument is in calibration by looking at the calibration sticker.



# Conduct a Wallflower Source Check

- Conduct a source check of the instrument.

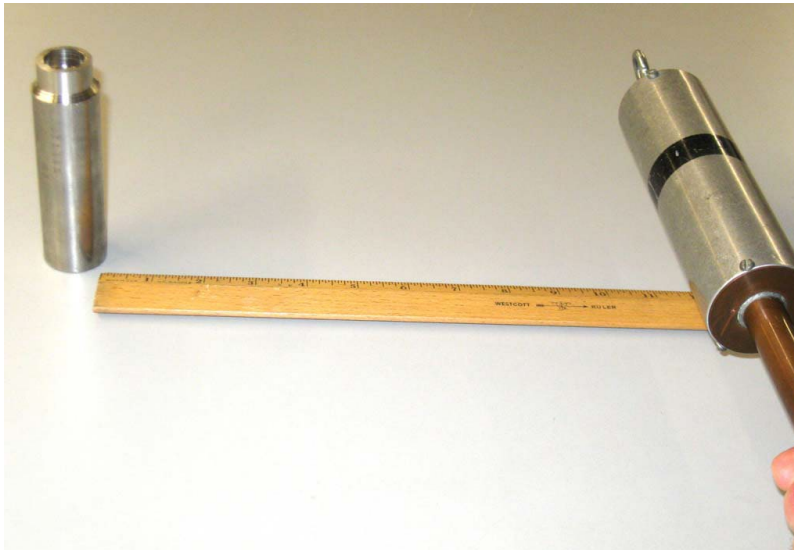
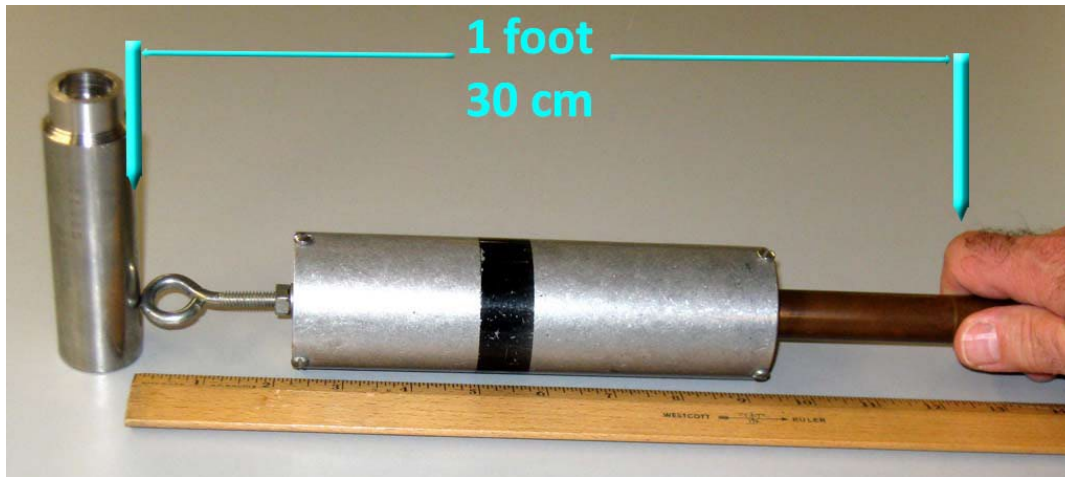


Place probe where shown.



Verify the response is within the designated range.

## Conduct a Wallflower Survey to Classify Radioactive Materials



- Take readings 1 foot (30 cm) away. Notch on handle measures 1 foot from the tip of the hook.
- Rotate the probe **sideways, at 90 degrees**, centered over hot spot to conduct a proper survey.

# Place Class Label on Radioactive Material

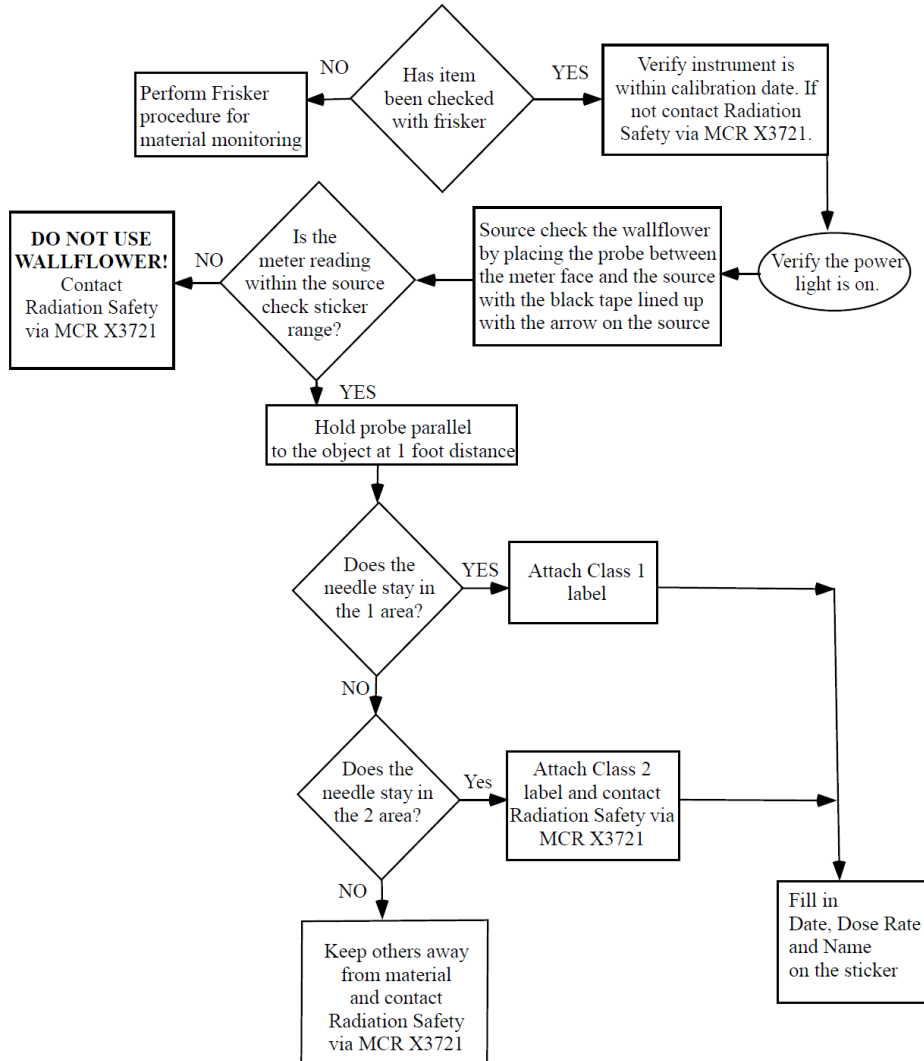
On the **correct** class label, legibly write:

1. Dose rate at 30 cm (1 foot) in xx mR/hr or upper limit at 30 cm (1 foot) such as <xx mR/hr
2. Date of survey
3. Your **FNAL ID number**, NOT your initials



# Flowchart: Radioactive Material Classification with Wallflower

## Wallflower Procedure for Class Level Determination



These are commonly posted near wallflowers.

## Hands-On Activities

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- Break into groups of roughly equal size, and proceed to a station.
- Practice charging a dosimeter, conducting a personnel frisk, surveying items for radioactivity, and surveying items to determine Class label. Use worksheet to document Class label.
- Instructors/RCTs will observe frisking and surveying to assure proper technique, slowness of the survey, etc. and answer questions.
- If you have questions about anything related to radiation safety, please ask your supervisor, assigned RSO, or an ES&H Section RCT.
- Thank you for your attention – Please Work Safely!

# Points of Contacts and Phone Numbers

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## Radiation Safety Officers (Go to others on list, if unavailable)

|  |              |
|--|--------------|
| <b>In Any Emergency</b>  | <b>X3131</b> |
| Maddie Schoell, Lead (Alternate Senior Radiation Safety Officer) | X4807        |
| Kathy Graden   | X4939        |
| Susan McGimpsey  | X8386        |
| Wayne Schmitt, Lead  | X4407        |
| Matt Quinn (Senior Radiation Safety Officer)                     | X5175        |



# Points of Contacts and Phone Numbers

| <b>Radiation Safety RCT's (Go to others on list, if unavailable)</b>             |              |
|--|--------------|
| <b>In any Emergency Call</b>   | <b>X3131</b> |
| Joel Fulgham, Lead   | X6525        |
| Tony Busch   | X6527        |
| Jose De La "O"   | X2557        |
| Paul Sedory  | X6666        |
| Dale White   | X6524        |
| <b>Hazard Control Technology Team<br/>(Go to others on list, if unavailable)</b> |              |
| <b>In Any Emergency</b>  | <b>X3131</b> |
| David Hockin, Lead   | X4498        |
| Lisa Reger   | x4734        |
| Amy Pavnica  | X8493        |
| Steve Carrigan   | X8879        |
| Dan Curatolo   | X3743        |