

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**Instructions for Obtaining Authorized User Status for Use of Radioactive Materials.**

The application process has been substantially revised. Therefore, please do not copy an authorized user's application from a previous year. It would serve a new applicant well to discuss his or her intent with either the Radiation Safety Officer (RSO) or the Assistant Radiation Safety Officer (ARSO) before starting to complete the paperwork.

New faculty members are asked during the General Safety presentation if they intend to use radioactive material. If so, they are given an application package. Alternately, you can contact the Radiation Safety Office (RSOF) and arrange to pick the packet up at the Office.

The packet contains an application checklist for the primary items subject to review by the Radiation Safety Committee (RSC) the approval of which is required before radioactive material may be used. The checklist accurately identifies the items that will be scrutinized. Therefore, adhere to it in developing an application.

Please call the Department Assistant for Radiation Safety at 368.2906 for the date of the next scheduled Radiation Safety Committee Meeting. **The completed application is to be returned to the RSOF no later than 2 weeks prior to this date. Be sure to highlight existing fields if they are not already. You must type your entries into the highlighted fields, or as otherwise directed (circle, sign, etc.).** The Department Assistant for Radiation Safety will record receipt and pass the package to the Assistant Radiation Safety Officer (ARSO) who will contact you to inform you if the package seems acceptable or if specific changes are necessary. First-time applicants at CASE are required to meet with the Radiation Safety Officer (RSO) or the Assistant Radiation Safety Officer (ARSO) to discuss the application in more detail. The Radiation Safety Office (RSOF) will contact you to arrange an appointment at mutual convenience for you and the Radiation Safety Officer or the Assistant Radiation Safety Officer.

When any needed changes are complete, the application is put on the agenda for the next monthly Radiation Safety Committee meeting. You will be informed immediately of the Committee's decision, which may require that you incorporate some minor corrections. If so, these are to be made in the final version of the proposal, since the proposal will be used in your laboratory to provide detailed directions to personnel who use the radioactive material it authorizes. Upon receipt of the final proposal by the RSOF, a letter of approval will be sent to you by the Radiation Safety Officer authorizing use and purchase of the requested isotopes.

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Complete responses on the Nuclide Request Form and its corresponding nuclide specific protocol description are particularly important since the Radiation Safety Committee will scrutinize these. One Nuclide Request Form must be submitted for each nuclide requested. The Committee's intent is that you produce a working document for use in your laboratory that gives clear, explicit directions to laboratory personnel such that they can perform the experiment described in a radiologically safe manner.

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**Guidance to the Applicant**

Complete all of the seven forms that are applicable. (The Sealed Source Form 4 and the Animal Application Form 6 are usually non-applicable.) Be sure to provide any required signatures. **If this is an amendment to an existing application, please call the Assistant Radiation Safety Officer to find out, which forms need to be completed.**

Note that Form 3, Nuclide Request Form, the applicant cannot sign both the Applicant and Chairperson designation. The second signature must be the Supervisor of the Applicant. If the Chairperson is the Applicant, then the second signature must be that of the Dean.

Note that Form 7, the Standard Laboratory Operating Procedures Form, is prepared for you to simply complete. You are to review the conditions for each of the 13 headings and enter a check mark indicating your acceptance of the specific requirements, or check the "other" box and attach a description of your alternative to the standard requirements. (It would be unusual for anyone to make such modifications.) Please be sure to enter your name, department, signature and date in the appropriate places.

**There must be an experimental protocol provided for each Nuclide Request Form.** The purpose of the Experimental Protocol written for the purpose of obtaining approval for radioisotope use by the Committee is NOT the same as one you would write in your laboratory notebook! (DO NOT USE A COPY OF A DETAILED LABORATORY PROTOCOL.) What is expected is clearly described in the following section that provides several examples.

If an animal protocol is submitted, an IACUC protocol should also be included. Also, if you are housing your animals in your laboratory as part of your animal protocol, a statement from the Animal Resource Center indicating that you have permission to do so should also be included.

The last item required in your application is a detailed radiation/contamination survey map of the area where the radioactive material is to be used and stored. A sample map and associated survey data sheet are provided following the series of forms. There is no need to produce a computer-generated drawing. However, you are expected to provide information equivalent to what is shown in the example. Identified items must include:

- Every piece of laboratory equipment that may become contaminated
- Non-radioactive work areas within the laboratory (to assure they are clean)
- Every location where radioactive material either is used or stored
- Storage unit handles (refrigerators, freezers, etc.)
- The Radioactive Waste Storage area(s)
- Floor areas throughout the laboratory, including locations at points of entrance/egress.

Items on the map are to be labeled with numbers corresponding to the entries on the survey data sheet. The data sheet must provide a descriptor for each numbered location. It is suggested that major items also be labeled on the map. (Do not use personal names such as "Victor's bench.")

Note that page numbers for this document are given in the upper right hand corner. However, for convenience of review by the Committee, please type sequential page numbers in the lower center of the application, as you assemble it for submittal.

The following list identifies items, frequently overlooked, that will expedite approval of your application.

**These deserve your meticulous attention:**

**Case Western Reserve University (CASE)  
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- All relevant forms must be type written, completed and signed as indicated on each one.
- All boxes on Form 7 must be checked (unless you describe an alternate) and the form must be signed.
- The survey map must include all items and areas that may become contaminated, including floor areas both near RAM use locations and at doorways.
- A survey data form accurately keyed to the survey map is essential.
- Choose your requested radioactive material possession limit (Item 2.c on Form 3) to assure sufficient margin to facilitate ordering. We recommend generally at least twice your estimated individual order amounts (Item 2.b).
- Assure your and all your worker radiation safety training is current.

#### **Examples of Experimental Protocols**

The purpose of an experimental protocol written as part of the application is to assure personnel radiation exposure and the probability of contamination are minimal. The protocol should be concise, one or several paragraphs in length. An experimental protocol should also be included if you are submitting an application for radioactive use in animals. It should address the following:

- **At the top of the Experimental Protocol include:**

**Isotope:**

**Half-Life:**

**Typical Radioactivity Used per Experiment (mCi):**

**Typical Number of Experiments per Month:**

**Typical Radioactivity Used per Month (mCi):**

**Requested Possession Limit (mCi):**

- A brief statement of the purpose of the experiment.
- The chemical form and total amount of isotope to be used in each experiment
- Shielding as necessary.
- Any laboratory equipment used in the experiment that may become contaminated. (Note that this equipment should be included on the survey map.)
- Whether it is possible for the material to become volatile during the experiment. (Volatility information is available from the RSOF.) If so, how will release or personnel exposure be controlled.
- Any radioactive wastes generated during the experiment
  - Whether chemical hazards will be present
  - The disposal methods
  - If possible, estimates of the activity and volume of each type of waste that will be generated.
- Is transport between laboratories required? If so, describe how this will be done.
- Any special security considerations.
- If infectious agents are used in the protocol, disposal methods for the waste generated should be included.

Volatilization of S-35 compounds is always a focal issue in protocol review. During thawing of frozen material pressure may buildup in a vial. Volatile decomposition products may be generated during storage that will be released upon opening the vial. Therefore such vials should be vented in a fume hood through a simple charcoal trap. For in-vivo labeling experiments in which an incubator is used, an empty 100 ml pipette tip tray is very convenient to contain the charcoal.

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
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*Sample Experimental Protocols*

DNA sequencing

**Isotope:**  $^{35}\text{S}$   
**Half-Life:** 88 dys  
**Typical Radioactivity Used per Experiment (mCi):** 0.050 mCi  
**Typical Number of Experiments per Month:** 2  
**Typical Radioactivity Used per Month (mCi):** 0.100 mCi  
**Requested Possession Limit (mCi):** 2.0 mCi

DNA sequencing will be used to verify the sequences of clones isolated as part of the cloning projects in the lab. Approximately 5.0  $\mu\text{Ci}$  of [ $^{35}\text{S}$ ]-dATP is used for each set of DNA sequencing reactions and a typical experiment will consist of 10 sets of reactions for a total of 50  $\mu\text{Ci}$  of [ $^{35}\text{S}$ ]-dATP per experiment. These reactions will be conducted in microcentrifuge tubes using bench top water baths set at 37°C under conditions in which volatilization of this isotope will not occur. Following incubation, the reactions will be briefly spun in a microcentrifuge and a formamide-loading buffer will be added to each set of reactions. Approximately 1/3 of each reaction (total 16.6  $\mu\text{Ci}$ ) will be loaded on a polyacrylamide sequencing gel. Following electrophoresis, the gel will be dried and placed in a film cassette for autoradiography.

Radioactive wastes generated during this procedure include contaminated microcentrifuge tubes and pipette tips that will be disposed of in the radioactive dry solid waste and stored for pickup by the RSOF. Gel running buffer will be counted to determine the appropriate disposal method. If the total amount of  $^{35}\text{S}$  in this buffer contains greater than 7  $\mu\text{Ci}$ , the buffer will be stored as liquid radioactive waste and held for pickup by the RSOF. If less than 7  $\mu\text{Ci}$  is present in the buffer, it may be disposed of as sewer waste in a designated sink provided the combined amount of  $^{32}\text{P}$  and  $^{35}\text{S}$  sewer waste does not exceed the 7  $\mu\text{Ci}$  per day limit. A log of all sewer disposals will be kept. Radioactive polyacrylamide gel waste will be disposed in containers for acrylamide waste and stored for pickup by the RSOF.

Northern/ Southern Analysis

**Isotope:**  $^{32}\text{P}$   
**Half-Life:** 14.3 dys  
**Typical Radioactivity Used per Experiment (mCi):** 0.050 mCi  
**Typical Number of Experiments per Month:** 2  
**Typical Radioactivity Used per Month (mCi):** 0.100 mCi  
**Requested Possession Limit (mCi):** 2.0 mCi

Northern hybridization analysis will be conducted to detect levels of gene expression.  $^{32}\text{P}$ -labeled nucleic acid probes will be made in small reactions (usually 10-50  $\mu\text{l}$ ) containing buffers, DNA polymerase, and 50  $\mu\text{Ci}$  of [ $^{32}\text{P}$ ]-dNTP. Incubations are carried out in a shielded 37°C water bath. During this reaction, >90% of the label will be incorporated into the probe and unincorporated label will not be removed prior to use in hybridization. For hybridization,  $^{32}\text{P}$ -labeled probes (20-50  $\mu\text{Ci}$ ) in aqueous solution are incubated in heat-sealed bags with nucleic acids that have been immobilized on filters.

To prevent contamination of water baths, double bags will be used and placed in sealed plastic containers. Incubations will be done overnight at 37-65°C in a marked shaking incubator. Unhybridized, labeled probe will be poured off into the liquid radioactive waste, followed by a brief rinse in a minimum amount of wash buffer that will also be discarded into the liquid radioactive waste. This results in the removal of the majority of the radioactive material from the membrane (>90%). The filters are then washed with dilute salt solutions until the background on filters is low.

Following counting, these wash solutions will be disposed of as sewer waste in a designated sink if they contain less than 7  $\mu\text{Ci}$ , provided the combined amount of  $^{32}\text{P}$  and  $^{35}\text{S}$  sewer waste does not exceed the 7  $\mu\text{Ci}$  per day limit. A log of all sewer disposals will be kept. The filters will be dried, placed in a film cassette for autoradiography and ultimately discarded in the dry-solid radioactive waste. All other radioactive wastes generated in this procedure, including pipette tips, hybridization bags, and filters will be disposed of in a shielded dry solid radioactive waste container and held for pickup by the RSOF.

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**RSOF/ RSC Application Checklist for \_\_\_\_\_ Date \_\_\_\_\_**

(This form will be used by the Radiation Safety Office (RSOF) to review your application and is provided as a convenience to you. Do not submit this with your application.)

**Forms**

- ☐ **Form 1 – General Information**
- ☐ **Form 2 – Training and Experience**
- ☐ **Form 3 – Nuclide Request Form (one for each nuclide)**
- ☐ **Experimental Protocol (one for each nuclide)**
- ☐ **Form 4 – Sealed Source Form (if needed)**
- ☐ **Form 5 – Laboratory Personnel List**
- ☐ **Form 6 - Animal Application Form (if needed)**
- ☐ **Form 7 – Standard Laboratory Operating Procedures Form**
- ☐ **Chemical Hygiene and Exposure Control Plans current**
- ☐ **Training current (Rad, Lab Saf, and/or BBP)**
- ☐ **Map/Legend**

**Nuclide Specific Items**

(See Nuclide Request Forms and Experimental Protocols)  
(One for each nuclide)

- |  |  |
|--|--|
| <input type="checkbox"/> <b>Nuclide</b>          | <input type="checkbox"/> <b>Activities (per order/ possession limit)</b> |
| <input type="checkbox"/> <b>Shielding</b>        | <input type="checkbox"/> <b>Chemical/ Physical Form</b>                  |
| <input type="checkbox"/> <b>Volatility</b>       | <input type="checkbox"/> <b>Laboratory equipment identified</b>          |
| <input type="checkbox"/> <b>Waste identified</b> | <input type="checkbox"/> <b>Waste storage location</b>                   |
| <input type="checkbox"/> <b>Disposal Methods</b> | <input type="checkbox"/> <b>Isotope storage/ Security</b>                |
| <input type="checkbox"/> <b>Bioassay</b>         | <input type="checkbox"/> <b>RAM Transport</b>                            |
| <input type="checkbox"/> <b>Purpose/Goal</b>     | <input type="checkbox"/> <b>Animals</b>                                  |
| <input type="checkbox"/> <b>Infectious</b>       |  |

V = OK

X = Not Needed

O = Missing/ Incomplete

# **APPLICATION FORMS**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
GENERAL INFORMATION FORM**

Office use only: PLG # _____ PI# _____
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This application is    ☐ new  
   ☐ an amendment to an existing application

1.    Name of Applicant: \_\_\_\_\_ Employee ID # \_\_\_\_\_  
      Title: \_\_\_\_\_ Department: \_\_\_\_\_  
      Laboratory Office: Building \_\_\_\_\_ Room \_\_\_\_\_  
      Dept. Office (if different from above): Building \_\_\_\_\_ Room \_\_\_\_\_  
      Phone #'s: Office \_\_\_\_\_ Lab \_\_\_\_\_ FAX # \_\_\_\_\_ Email \_\_\_\_\_

2.    Location of use and storage of Radioactive Material:  
      Building: \_\_\_\_\_ Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_  
      Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_  
      Building: \_\_\_\_\_ Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_  
      Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_ Rooms: \_\_\_\_\_

3.    Radiation Monitoring Devices  
      Liquid Scintillation Counter Used:  
      Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_ Serial #: \_\_\_\_\_  
      Internal Std: \_\_\_\_\_ Activity: \_\_\_\_\_ Assay Date: \_\_\_\_\_  
      Location: \_\_\_\_\_ Responsible AU: \_\_\_\_\_  
      Gamma Counter Used:  
      Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_ Serial #: \_\_\_\_\_  
      Location: \_\_\_\_\_ Responsible AU: \_\_\_\_\_  
      Hand Held Survey Meter: (owned by you)  
      Mfg: \_\_\_\_\_ Model: \_\_\_\_\_ Serial #: \_\_\_\_\_ Probe: \_\_\_\_\_  
      Mfg: \_\_\_\_\_ Model: \_\_\_\_\_ Serial #: \_\_\_\_\_ Probe: \_\_\_\_\_  
      Check Source Available: Y \_\_\_\_\_ N \_\_\_\_\_ Type \_\_\_\_\_

**(CIRCLE ONE) I AM / AM NOT** currently using radioactive materials on the University Hospital ODH license or a license held by another institution. I signify that I have read the Radiation Safety Manual issued by the Radiation Safety Committee of CASE governing the use of radiation sources and radioactive material, and agree to comply with all applicable regulations.

**APPLICANT** \_\_\_\_\_ **DATE** \_\_\_\_\_

**Signature**

**FORM 1**

## APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM) TRAINING AND EXPERIENCE FORM

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**Case Western Reserve University (CASE)  
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Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
NUCLIDE REQUEST FORM  
(USE ONE FORM FOR EACH NUCLIDE REQUESTED)**

Office use only: PLG # \_\_\_\_\_ PI# \_\_\_\_\_

1. Name of Applicant: \_\_\_\_\_  
(Consult the Authorized User section of the Radiation Safety Manual for instructions on completing the following sections.)  
-----
2. a. Radionuclide: \_\_\_\_\_  
b. Estimated to be ordered per shipment: \_\_\_\_\_ mCi  
c. Maximum to be possessed at any one time: \_\_\_\_\_ mCi  
(The possession amount should be at least twice the amount ordered per shipment.)  
-----
3. Chemical Compounds or Physical Forms: \_\_\_\_\_
4. Isotope storage/security (Lab location/how secured): \_\_\_\_\_
5. Waste storage location: (Room number): \_\_\_\_\_
6. Shielding requirements: \_\_\_\_\_
7. Bioassay requirements: \_\_\_\_\_
8. Will any infectious agents be used with this protocol? Yes No

I acknowledge the Chairperson's authority to allow review of my application by upper administration officials at the University.

\_\_\_\_\_  
**APPLICANT**                      **DATE**                      **DEPT. CHAIRPERSON**                      **DATE**

**FOR RSOF USE ONLY APPROVAL**

_____ RSO	_____ DATE	_____ CHAIRPERSON RSC	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ UHCMC RSO	_____ DATE	(If Applicant is AU at UHCMC)	

**FORM 3**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
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**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
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\_\_\_\_\_  
APPLICANT

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DEPT. CHAIRPERSON

\_\_\_\_\_  
DATE

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DEPT. CHAIRPERSON

\_\_\_\_\_  
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DEPT. CHAIRPERSON

\_\_\_\_\_  
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APPLICANT

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\_\_\_\_\_  
DEPT. CHAIRPERSON

\_\_\_\_\_  
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**APPLICANT**

\_\_\_\_\_  
**DATE**

\_\_\_\_\_  
**DEPT. CHAIRPERSON**

\_\_\_\_\_  
**DATE**

**FOR RSOF USE ONLY APPROVAL**

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_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
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**FORM 3**

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Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
NUCLIDE REQUEST FORM  
(USE ONE FORM FOR EACH NUCLIDE REQUESTED)**

Office use only: PLG # \_\_\_\_\_ PI# \_\_\_\_\_

1. Name of Applicant: \_\_\_\_\_  
(Consult the Authorized User section of the Radiation Safety Manual for instructions on completing the following sections.)

2. a. Radionuclide: \_\_\_\_\_  
b. Estimated to be ordered per shipment: \_\_\_\_\_ mCi  
c. Maximum to be possessed at any one time: \_\_\_\_\_ mCi  
(The possession amount should be at least twice the amount ordered per shipment.)

3. Chemical Compounds or Physical Forms: \_\_\_\_\_

4. Isotope storage/security (Lab location/how secured): \_\_\_\_\_

5. Waste storage location: (Room number): \_\_\_\_\_

6. Shielding requirements: \_\_\_\_\_

7. Bioassay requirements: \_\_\_\_\_

8. Will any infectious agents be used with this protocol? Yes No

I acknowledge the Chairperson's authority to allow review of my application by upper administration officials at the University.

\_\_\_\_\_  
APPLICANT

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DEPT. CHAIRPERSON

\_\_\_\_\_  
DATE

**FOR RSOF USE ONLY APPROVAL**

_____ RSO	_____ DATE	_____ CHAIRPERSON RSC	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ UHCMC RSO	_____ DATE	(If Applicant is AU at UHCMC)	

**FORM 3**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
NUCLIDE REQUEST FORM  
(USE ONE FORM FOR EACH NUCLIDE REQUESTED)**

Office use only: PLG # \_\_\_\_\_ PI# \_\_\_\_\_

1. Name of Applicant: \_\_\_\_\_  
(Consult the Authorized User section of the Radiation Safety Manual for instructions on completing the following sections.)

2. a. Radionuclide: \_\_\_\_\_  
b. Estimated to be ordered per shipment: \_\_\_\_\_ mCi  
c. Maximum to be possessed at any one time: \_\_\_\_\_ mCi  
(The possession amount should be at least twice the amount ordered per shipment.)

3. Chemical Compounds or Physical Forms: \_\_\_\_\_

4. Isotope storage/security (Lab location/how secured): \_\_\_\_\_

5. Waste storage location: (Room number): \_\_\_\_\_

6. Shielding requirements: \_\_\_\_\_

7. Bioassay requirements: \_\_\_\_\_

8. Will any infectious agents be used with this protocol? Yes No

I acknowledge the Chairperson's authority to allow review of my application by upper administration officials at the University.

\_\_\_\_\_  
APPLICANT

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DEPT. CHAIRPERSON

\_\_\_\_\_  
DATE

**FOR RSOF USE ONLY APPROVAL**

_____ RSO	_____ DATE	_____ CHAIRPERSON RSC	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ UHCMC RSO	_____ DATE	(If Applicant is AU at UHCMC)	

**FORM 3**



**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
REQUEST FOR USE OF A SEALED SOURCE**

Office use only: PLG # \_\_\_\_\_ PI# \_\_\_\_\_

1. Name of Applicant: \_\_\_\_\_
  
2. Sealed Sources:
  - a. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_  
 -----
  - b. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_  
 -----
  - c. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_

APPLICANT	DATE	DEPT. CHAIRPERSON	DATE
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**FOR RSOF USE ONLY APPROVAL**

RSO	DATE	CHAIRPERSON RSC	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE

**FORM 4**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
REQUEST FOR USE OF A SEALED SOURCE**

Office use only: PLG # \_\_\_\_\_ PI# \_\_\_\_\_

1. Name of Applicant: \_\_\_\_\_
2. Sealed Sources:
  - a. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_  
 -----
  - b. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_  
 -----
  - c. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_

\_\_\_\_\_  
**APPLICANT                      DATE                      DEPT. CHAIRPERSON                      DATE**

**FOR RSOF USE ONLY APPROVAL**

_____ RSO	_____ DATE	_____ CHAIRPERSON RSC	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE
_____ RSC MEMBER	_____ DATE	_____ RSC MEMBER	_____ DATE

**FORM 4**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
REQUEST FOR USE OF A SEALED SOURCE**

Office use only: PLG # \_\_\_\_\_ PI# \_\_\_\_\_

1. Name of Applicant: \_\_\_\_\_
  
2. Sealed Sources:
  - a. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_  
 -----
  - b. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_  
 -----
  - c. Radionuclide: \_\_\_\_\_ Form: \_\_\_\_\_  
 Activity: \_\_\_\_\_ mCi Assay Date: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Location: Building \_\_\_\_\_ Room: \_\_\_\_\_

APPLICANT	DATE	DEPT. CHAIRPERSON	DATE
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**FOR RSOF USE ONLY APPROVAL**

RSO	DATE	CHAIRPERSON RSC	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE
RSC MEMBER	DATE	RSC MEMBER	DATE

**FORM 4**

## APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM) LABORATORY PERSONNEL LIST

List the names of all personnel in your laboratory who will use radioactive materials. Indicate the most recent training date for each, and designate those to whom you delegate isotope-ordering privileges. This list must be updated when personnel join or leave your laboratory

[illegible]

Chemical Hygiene Plan Current Date \_\_\_\_\_  
Exposure Control Plan Current Date \_\_\_\_\_

All personnel must be current in Lab. Saf. and/ or BBP Training.

APPLICANT \_\_\_\_\_

SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

**FORM 5**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS (RAM)  
APPLICATION FOR USE OF RADIOISOTOPES IN ANIMALS**

Applicant: \_\_\_\_\_ Office Telephone No: \_\_\_\_\_  
Title: \_\_\_\_\_ Department: \_\_\_\_\_

Animal species to be used (circle one): Mouse Rat Cat Dog Other: \_\_\_\_\_

Description of isotope(s) physical and chemical form (Circle as appropriate):  
If infectious agent(s) will be used along with radioactivity, please list under #3

1. **H-3 C-14 P-32 S-35** other: \_\_\_\_\_

2. **Solid Liquid Gas** Chemical form: \_\_\_\_\_

3. Infectious agent(s) used: \_\_\_\_\_

Amount administered per animal: \_\_\_\_\_ mCi/ animal

Maximum number of animals to be housed on any given day: \_\_\_\_\_

Number of animals per cage: \_\_\_\_\_

Describe experimental protocol for the use of the radioisotopes:

1. Mode of administration: \_\_\_\_\_ **Intraperitoneally**  
\_\_\_\_\_ **Per oral**  
\_\_\_\_\_ **Subcutaneous**  
\_\_\_\_\_ **Intra dermal**  
\_\_\_\_\_ Other \_\_\_\_\_

Room where administration will take place: \_\_\_\_\_

2. Housing - Where will the animals be held following administration of the isotope?  
\_\_\_\_\_

3. On a separate sheet describe the elimination of radioactivity from the animal. (Provide support from your data indicating the need for monitoring is non-existent or plan to monitor the elimination of the radioactivity in the feces, urine, or breath from the animal.)

**FORM 6-1**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

4. Duration of animal housing **post** administration of the radioisotope: \_\_\_\_\_ days.
5. Monitoring should take place during and after administration of the radioisotope. Provide a brief description of how the following will be monitored for contamination as well as how the waste will be handled if the waste contains infectious agents:
  - a. Personnel
  - b. Surgical tools
  - c. Bedding
  - d. Cages
  - e. Cage area
  - f. Animal carcass or tissue
6. Labeling and posting of area [cages and work area, door into room]:
7. Describe disposal or decontamination procedures for:
  - a. Animal carcass
  - b. Bedding or excreta
  - c. Cage

**FORM 6-2**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

Experience of involved personnel in the use of isotopes with animals:

Involvement of CWRU Animal Resource Center personnel in project:

1. Isotope administration:

2. Post injection care:

A room for radioisotope use must be scheduled with the Animal Resource Center and Radiation Safety Office prior to the administration of radioisotopes to the animals.

Room: \_\_\_\_\_

Scheduled dates of use: from \_\_\_\_\_ until \_\_\_\_\_

\_\_\_\_\_  
**APPLICANT**

\_\_\_\_\_  
**DATE**

**FOR RSOF USE ONLY APPROVAL**

RSO _____	DATE _____	CHAIRPERSON RSC _____	DATE _____
RSC MEMBER _____	DATE _____	RSC MEMBER _____	DATE _____
RSC MEMBER _____	DATE _____	RSC MEMBER _____	DATE _____
RSC MEMBER _____	DATE _____	RSC MEMBER _____	DATE _____
RSC MEMBER _____	DATE _____	RSC MEMBER _____	DATE _____
ARC Representative _____	DATE _____		

**FORM 6-3**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**APPLICATION FOR NON-HUMAN USE OF RADIOACTIVE MATERIALS  
STANDARD LABORATORY OPERATING PROCEDURES**

Applicant \_\_\_\_\_ Department \_\_\_\_\_

**SURVEY FREQUENCY**

☐ as listed below ☐ other – see attached

- All laboratories containing radioactive materials must conduct documented contamination surveys monthly.
- If more than 200  $\mu\text{Ci}$  are handled during a procedure, then either a post-experiment or a weekly survey must be documented.
- Any documented survey includes BOTH a survey meter probe of surfaces and a wipe test (except for tritium, wipe test only).

**SURVEY METER USE**

☐ as described below ☐ other - see attached ☐ not applicable

- Confirm the survey instrument is appropriate for detecting the isotopes used.
- Verify the survey instrument's calibration is current.
- Perform battery check; replace if needed.
- Test with operational check source if available.
- Set meter to "fast" response with audio "on" if available.
- Remove all coverings from probe.
- Hold probe close to surface and move slowly over surface during survey.

**PERFORMANCE OF WIPE TEST**

☐ as described below ☐ other - see attached

- Use filter paper or smears.
- Wipe 100  $\text{cm}^2$  area with gentle pressure.
- Count wipe with appropriate instrument.

**CONTAMINATION SURVEY DOCUMENTATION**

☐ as described below ☐ other - see attached

- Survey map with record form to include survey instrument (portable meter, LSC, or gamma counter) information, signature of surveyor and date performed.
- Record probe results in dpm, wipe results in dpm/100  $\text{cm}^2$  if contamination is found. Otherwise you can record BKG or indistinguishable from background.
- Decontaminate contaminated areas, re-survey, and document final results.
- Inform AU of any contamination.
- Keep records accessible for inspection.

**FORM 7-1**



**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**REMOVABLE CONTAMINATION LIMITS**

☐ as listed below ☐ other - see attached

- Decontamination is immediately required if the following levels of contamination are found:
  - 220 dpm/100 cm<sup>2</sup> for all beta/gamma except H-3, C-14, S-35
  - 2200 dpm/100 cm<sup>2</sup> for H-3, C-14, S-35
- In practice, any contamination readily distinguishable from background should be removed from work areas.

**PACKAGE RECEIPT**

☐ as listed below ☐ other - see attached

- Wear Personnel Protective Equipment (PPE).
- Open packages of volatile materials in a fume hood.
- Document all probe and wipe results as required on the package receipt form.
- Notify RSOF if contamination identified.
- Deface all radioactive labeling before discarding uncontaminated packaging as non-radioactive waste.
- Retain completed package receipt form in lab radioactive materials notebook.

**STORAGE AND SECURITY OF RADIOACTIVE MATERIAL (RAM)**

☐ as described below ☐ other - see attached

- Labeling of all storage units (freezer, refrigerator, or cabinet) shall be in accord with requirements as stated in the Radiation Safety Manual.
- Radioactive material (RAM) shall be secured from unauthorized access at all times.
- Any time RAM is left unattended by an authorized user, a locked barrier shall prevent unauthorized access.

**RADWASTE DISPOSAL AND RECORD MAINTENANCE**

☐ as listed below ☐ other – see attached

- Liquid wastes have double containment.
- Suitable containers available for all waste.
- Biohazard waste sterilized.
- Pipettes and pipette tips should be placed in a rigid container.
- Segregate by isotope, type (solid, liquid, scintillation vials, sharps, and gels), and hazard class.
- Sewer limits in accord with Radiation Safety Manual requirements, unless an explicit exemption is requested. Liquids disposed via the sewer must not contain regulated chemicals. The pH should be between 6 and 8.
  - less than or equal to 20 µCi/day for C-14 and H-3, EACH.
  - less than or equal to 7 µCi/day for all other isotopes (e.g., P-32, S-35), combined.
  - Log all sewer disposals to include isotope, activity and date.
  - Retain sewer disposal log for inspection.
- Maintain inventory records showing all waste disposal.

**FORM 7-2**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

**PERSONNEL DOSIMETRY**

☐ as listed below ☐ other - see attached

- Each individual likely to receive a measurable radiation dose will wear personal dosimetry.
- Whole body and, if appropriate, extremity dosimeters will be worn whenever working in the laboratory.
- Dosimetry will be worn and stored as described in the Radiation Safety Manual.
- Female workers shall be informed on their right to monthly fetal dose monitoring by submitting a Pregnancy Declaration Form to the Radiation Safety Office.

**SAFE WORK PRACTICES**

☐ agree and will enforce those listed below

- Do not eat or store food in lab areas or near RAM-labeled equipment.
- Do not apply cosmetics or lotions in laboratory areas.
- Use RAM work areas that are as small as practical.
- Wear appropriate protective clothing (e.g. gloves, lab coat).
- Work with volatile materials in an operable fume hood.
- Do not mouth-pipette.
- Leave a survey meter on within arms reach when working with RAM when appropriate to provide frequent contamination checks of yourself and equipment.
- Survey all waste items before placing into the trash; then place into the appropriate trash container.
- Do not compact waste into bundles before disposal.

**INCIDENT RESPONSE**

☐ as described below ☐ other - see attached

- **Minor Spill** - a spill that remains contained, that you can easily, effectively contain and cleanup without assistance from the Radiation Safety Office and that does not involve personnel contamination. Decontaminate and verify that all contamination is removed.
- **Major Spill** - a spill that involves personnel contamination or results in contamination outside of the intended work area, and that cannot be promptly cleaned up. Immediately notify RSOF of a major spill.

**DECONTAMINATION PROCEDURES**

☐ as described below ☐ other - see attached

The following items will be accessible for decontamination:

- liquid soap in squirt/spray bottle
- absorbent paper towels and radwaste bags
- appropriate PPE to include gloves and lab coats
- radioactive warning tape
- survey meter and wipes/smears.

**FORM 7-3**

**Case Western Reserve University (CASE)  
Department of Environmental Health & Safety (EHS)  
Radiation Safety Office (RSOF)**

- Contaminated Skin
  - Wash with mild soap and running water (or wet towels).
  - Do not abrade skin.
  - Survey after each washing and drying.
- Notify RSOF if any skin contamination remains
  
- Contaminated Clothing
  - Remove the contaminated clothing carefully to avoid or minimize contaminating the skin.
  - Check the skin for possible contamination.
- Notify RSOF
  
- Floor Contamination
  - Secure access to general area.
  - Define boundary of contaminated area.
  - Check for personnel contamination.
  - If a major spill, notify RSOF.
  - If a minor spill, decontaminate. Use a spray cleaning solution and wipe up with paper towels or other absorbent material to remove contamination. Be careful not to flood the area with cleaner since that will wash contamination into cracks, making it harder to remove.
  
- Equipment Contamination
  - If contamination removable, decontaminate to comply with contamination limits.
  - If fixed contamination remains, label equipment with isotope, activity and date.
  - Contact RSOF if assistance required.

**EMERGENCY RESPONSE PROCEDURES**

[ ] as described below [ ] other - see attached

For any situation perceived as an emergency involving radioactive materials, notify the Radiation Safety Office at (368-2906) during office hours (8:30 a.m. - 5:00 p.m.) or Security (368-3333) after hours. Fire and Medical emergencies should be directly referred to security at (368-3333) at all times. They will coordinate emergency response communications and notifications with hospital, ambulance, and fire personnel.

- Fire or Medical Emergencies
  - If practical, secure radioactive material.
  - Follow CWRU emergency response procedures.
  - Inform Security if radioactive material involved.
  - Call RSOF (confirmatory).

I will abide by these procedures to implement safe use of radioactive materials in compliance with regulations as communicated by the Radiation Safety Office.

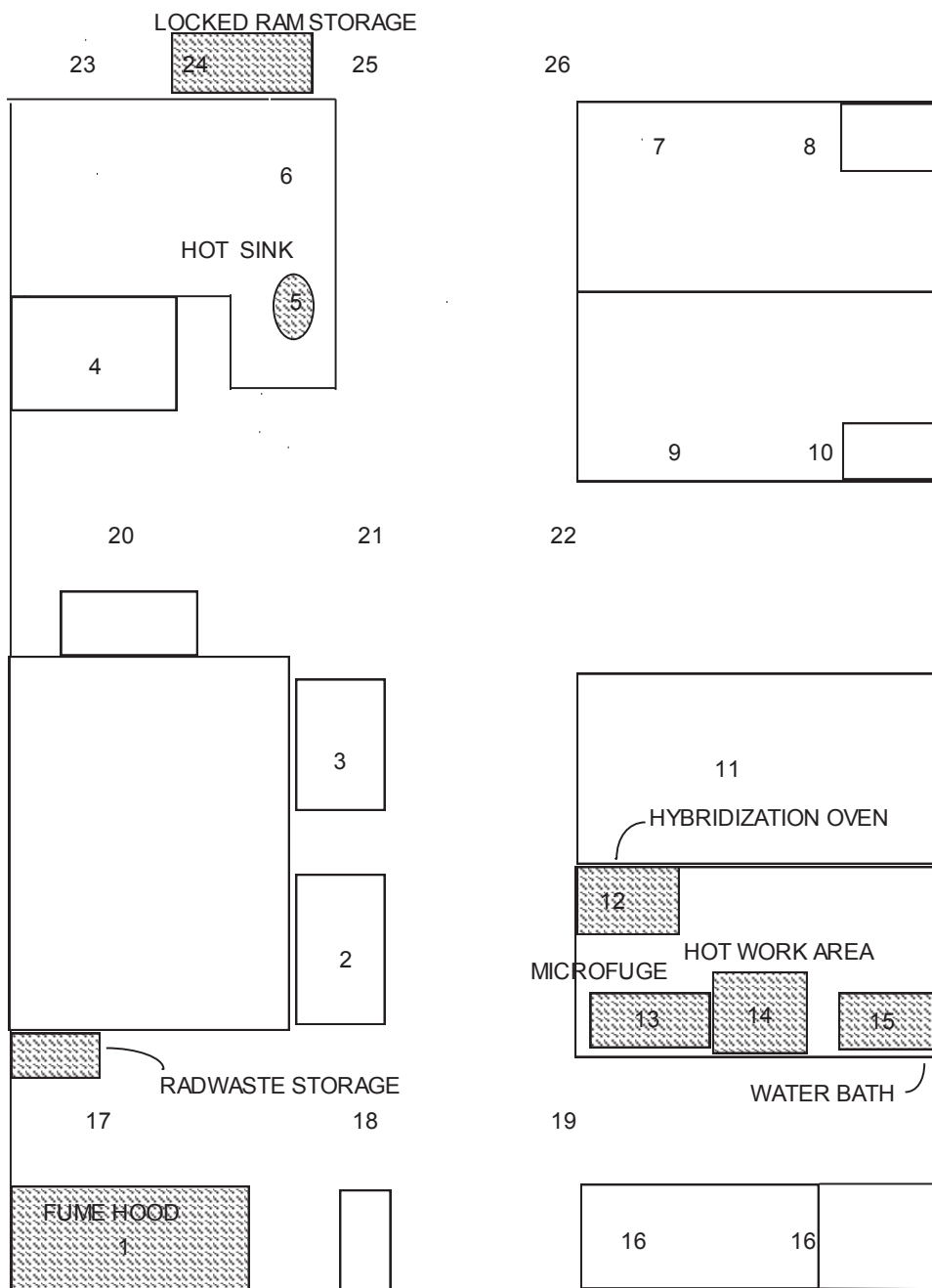
\_\_\_\_\_  
**Printed Name**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Date**

**FORM 7-4**

**Case Western Reserve University (CASE)**  
**Department of Environmental Health & Safety (EHS)**  
**Radiation Safety Office (RSOF)**



SAMPLE SURVEY MAP

**Case Western Reserve University (CASE)**  
**Department of Environmental Health & Safety (EHS)**  
**Radiation Safety Office (RSOF)**

#	Location	Probe, cpm	Probe Activity, Wipes, dpm *	Wipe Activity, net cpm	Wipe Activity, dpm/100 sq cm
1	<b>Fume Hood</b>				
2	Freezer, In/Out				
3	Refrigerator, In/Out				
4	Table				
5	<b>Sink</b>				
6	Counter				
7	Bench				
8	Desk				
9	Bench				
10	Desk				
11	Bench				
12	<b>Hybridization Oven</b>				
13	<b>Microfuge</b>				
14	<b>Hot Work Area</b>				
15	<b>Water Bath</b>				
16	Bench and Desk				
17	Floor				
18	Floor				
19	Floor				
20	Floor				
21	Floor				
22	Floor				
23	Floor				
24	<b>Freezer, In/Out</b>				
25	Floor				
26	Floor				

√ = Indistinguishable from background

\* dpm = (cpm - bkg) / efficiency

Surveyed by: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Handheld Meter/Probe Information:

Make: \_\_\_\_\_ Model: \_\_\_\_\_ SN: \_\_\_\_\_ Cal Due Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Probe type: GM NaI Other Model: \_\_\_\_\_ SN: \_\_\_\_\_

**SAMPLE SURVEY DATA SHEET**