From:	Roldan, Lizette
To:	Hill, Carol
Subject:	FW: Request to amend our license: RSO change and changes to Radiation Safety Manual
Date:	Wednesday, May 25, 2011 6:26:09 AM
Attachments:	Cover_letter_Amendment_request_RSO_Manual_changes_11_05_24.pdf RSM_051211.pdf Qualification Statement for Paul J.pdf

Hi Carol,

Please set up this amendment.

Thanks,

Lisey

Lizette Roldán-Otero, Ph.D.
U.S. NRC Region IV
Health Physicist
817-276-6596

From: Douglas B Kent [mailto:dbkent@usgs.gov]
Sent: Tuesday, May 24, 2011 8:11 PM
To: Roldan, Lizette
Cc: Paul J Kovach; Andrew T Calvert; Cynthia L Brown
Subject: Request to amend our license: RSO change and changes to Radiation Safety Manual

Dear Dr. Roldan-Otero,

Please find the following three documents attached to this email message:
1) Cover letter requesting an amendment to our license to change the Radiation Safety Officer and apply associated revisions to our Radiation Safety Manual
2) The revised Radiation Safety Manual
3) Qualifications of Mr. Paul Kovach to serve as Radiation Safety Officer.

Please let me know if you have any questions regarding this request.

Sincerely,
Doug Kent
Radiation Safety Officer

Dr. Douglas B. Kent
Research Hydrologist
U. S. Geological Survey
345 Middlefield Rd. MS 496
Menlo Park, CA 94025
USA
tel: (650) 329-4461 fax: (650) 329-4327

email: dbkent@usgs.gov

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
345 Middlefield Road, MS 496
Menlo Park, CA 94025
Tel: (650) 329-4461
Fax: (650) 329-4545
Email: dbkent@usgs.gov
May 24, 2011

Dr. Lizette Roldán-Otero
Nuclear Regulatory Commission
612 E. Lamar Blvd., Suite 400
Arlington, TX 76011

License: 04-06674-07

Dear Dr. Roldán-Otero:

We request an amendment to our license to replace the current Radiation Safety Officer (RSO), Dr. Douglas Kent, with Mr. Paul Kovach. This change reflects a decision by USGS to management to hire a health physicist to serve as the RSO rather than contract out the health physics expertise. The following changes to the Radiation Safety Manual have been made to reflect this change:

a. Essential responsibilities formerly assigned to the health physics consultant now assigned to RSO;
b. Revise responsibilities of RSC, RSC Chairperson, RSC Secretary and RSO as necessary

Mr. Kovach is endorsed by USGS management and our Radiation Safety Committee to serve as the RSO.
This revised Radiation Safety Manual has been reviewed and approved by the Radiation Safety Committee.
Please consider this letter, with attachments, as our request to amend our above referenced Radioactive Materials License as follows:
Attachments:

1. Radiation Safety Manual pertaining to the Menlo Park License
2. Statement of Qualifications for Paul J. Kovach

Please let me know if you have any questions.

Sincerely,

Dr. Douglas B. Kent
Research Hydrologist and Radiation Safety Officer

RADIATION SAFETY MANUAL
U.S. GEOLOGICAL SURVEY, MENLO PARK, CA

Revision May10, 2011 (New USGS Radiation Safety Officer)
Editorial Revision October 26, 2010 following Bureau Audit
Editorial Revision July 7, 2009 (Guest Badge Clarification, RAM transfer)
Editorial Revision July 1, 2008 (Guest Badge Policy Update)
Editorial Revision January 10, 2007
Editorial Revision July 19, 2006
Editorial Revision April 27, 2005
Editorial Revision November 30, 2002 (Name Change)
Accepted January 26, 2000
Revised December 1, 1999
Revised November 17, 1993
Revised May 23, 1988
Revised March 19, 1983
Revised March 21, 1978
Revised September 8, 1977

TABLE OF CONTENTS
U.S. GEOLOGICAL SURVEY
RADIATION SAFETY MANUAL

APPENDICES

RADIATION SAFETY MANUAL

I. ADMINISTRATION

PURPOSE

This manual implements USGS, MP commitments to federal, State and local regulations, USGS Radiation Safety Policy and the Menlo Park Radioactive Materials License (RAML), and serves as a basis for operations involving use of radioactive materials covered under the RAML (henceforth refered to as "licensed material") at the USGS Menlo Park and related worksites as specified in the RAML. This manual is incorporated into the Radioactive Materials License, by reference, and any changes to it may require an amendment to the RAML.

Unless otherwise stated, all terms in this document, e.g., RAML, RSC, Radiation Safety Program, etc., refer to the Menlo Park, CA work location and the related work locations as specified in the RAML.

OBJECTIVES

To establish the requirements by which staff working under the RAML operate and are trained;

To identify and detail requirements that establish and maintain the Radiation Safety Program (RSP);

To identify the responsible authorities of the Radiation Safety Program and specify their responsibilities;

To detail USGS commitments to comply with federal, State and local regulations, USGS policies and the RAML, and facilitate compliance.

RESPONSIBILITIES AND AUTHORITIES

This manual is created and maintained by the authority of the USGS. All personnel involved in activities using licensed materials, and those otherwise designated by the Radiation Safety Committee (RSC) or Radiation Safety Officer (RSO), are responsible to comply with the provisions of this manual as a condition of their use of licensed materials. The Radiation Safety Committee has ultimate responsibility for the Radiation Safety Program by authority of the RAML. This manual is maintained by authority of the RSC. This manual is reviewed and approved by the RSC and the RSC is responsible for its content. Changes to this manual shall be approved by the RSC, and forwarded to the NRC as deemed necessary by the RSC.

A. RADIATION SAFETY COMMITTEE

1.0 General

The RSC was established as a permanent committee on January 8, 1976, by the Assistant Director of the U.S. Geological Survey, Western Region, U.S. Department of Interior. The RSC reports to the Director's representative of the U.S. Geological Survey, Western Branch and has the ultimate responsibility for radiation safety and licensed materials possessed and used under the authority of the RAML.

The RSC will establish administrative and physical controls, procedures, recordkeeping, accounting, reviews, and other means as necessary to ensure safe operations and minimize environmental impact related to the use of licensed materials. The RSC shall retain an RSO as a resource to accomplish their mission.

2.0 Membership

The RSC will consist of at least one licensed materials User from each Permit, the RSO, and the Director's representative or their designee. One of the RSC members, other than the RSO and Director's representative, shall function as the RSC Chairperson. One of the RSC members shall function as the RSC Secretary. Although the management representative shall be exempt from specific technical qualifications, User members of the RSC will be selected on the basis of their training and experience in working with licensed materials. Each member may designate an alternate who is authorized to attend meetings with full voting rights in the absence of the permanent member.

Minimum qualifications for User membership on the RSC are:

Sitting members:

A. A bachelor's degree in natural science.
B. At least two years of experience in use and handling of licensed materials and six months as a User at USGS, MP.
C. Named in a valid USGS, MP Radiation Use Permit (hereinafter called a Permit, see section C) or USNRC License.

Alternates: Named in a valid USGS, MP Permit or USNRC License.

Officers (Chairperson, Secretary): Members of the RSC with at least six months tenure and permanent employees of USGS, MP.

2.1 Officers of the RSC shall be the Chairperson and Secretary, selected by and from the sitting RSC members by January of each year, assuming their duties by March. The Director's representative shall not serve as either Chairperson or Secretary.

2.2 The RSO is responsible for developing and maintaining the Radiation Safety Program, and for implementing the Radiation Safety Program on a day-to-day basis with the advice, assistance, and oversight of the RSC. In the absence of the RSO, duties will be performed on a short-term basis by the Alternate Radiation Safety Officer (ARSO). The ARSO position can be filled by the RSC Chairperson, User member, or a designee approved by the RSC.

3.0 Meeting procedures

3.1 The RSC shall meet regularly every other month and at other times as may be required for the purpose of accepting, reviewing, and acting upon proposed uses of licensed materials and other matters of business that may occur. Business between scheduled meetings may be handled by memoranda. If required, RSC business may also be handled by telephone, in which case documentation will be prepared promptly in the form of a memorandum to the record or recorded in a phone log, describing in detail any actions or decisions made.

3.2 A quorum of 2/3 of the members or alternates constitutes a valid RSC. When a vote of the RSC is required, a simple majority of the members or alternates present will be necessary for approval.

3.3 Even though the Director's representative may not possess certain technical knowledge, the RSC is formulated in order to provide an adequate forum for the consideration of all pertinent issues, including management-related concerns. Therefore, the Director's representative shall have the right to vote on all issues brought before the RSC. At his/her discretion, the Director's representative may choose to abstain from voting on matters which are deemed "technical issues".

3.4 All correspondence requiring RSC action will be placed on the RSC agenda by the RSC Chairperson in the order that it is received unless, at the discretion of the Chairperson, certain items may be given priority attention, particularly when they involve the health and safety of employees or the public. The RSO will provide advice to the RSC Chairperson regarding prioritization of issues requiring RSC action.

3.5 Throughout this manual all references to the RSC Chairperson or RSC Secretary means either the sitting or acting officer in these capacities. Documents, minutes, and memoranda signed by an acting officer shall have the same import as those signed by the officer represented unless over-ruled by a RSC action.

3.6 The RSC meetings will normally be held according to the rules of the latest edition of Robert's Rules of Order.

3.7 The RSC Secretary or designee shall prepare the minutes of meetings of the RSC.

4.0 Functions and responsibilities of the RSC.

The RSC has responsibility to control the possession, use and disposal of licensed materials under the RAML within regulatory requirements and to minimize impact to individuals and the environment.

4.1 The RSC operates under the authority of a Radioactive Materials License issued by the US NRC. Under the conditions of this license, the RSC evaluates and approves the safe use of licensed materials. It is not the function of the RSC to restrict the use of licensed material, rather it is to be concerned with the task of maintaining the safety of personnel, operations and facilities involved in the use of such material.

4.3 The RSC shall maintain the records necessary to meet its responsibilities and comply with the appropriate federal regulations. The RSO shall prepare and hold these records in the form of a permanent file. These records shall be available at any time upon a request to the RSC. Such records will be available for inspection by USNRC personnel. These records will include but are not limited to the following:

a. Records of licensed materials procurement, receipt, transfer, and disposal.

b. Copies of annual User inventories (Part I, D, 4.1).

c. Personnel monitoring records.

d. Laboratory facility descriptions

e. Laboratory radiological use and surveillance histories (authority may be delegated to Principal Users).

f. Records of laboratory close-out surveys approved by the USNRC as stated in Condition 26 of the License.

g. RSC records will include all actions taken by the RSC, including action taken on applications for Permits and specific conditions attached to such Permits.

h. Sealed source wipe test records.

i. Survey instrument calibration records.

4.4 The RSC shall ensure that an annual review of the radiation safety program is performed and documented. A formal report of the review shall be filed in the RSC records. RSC Meeting attendance shall include, but not be limited to, RSC members including the representative of management and the RSO.

5.0 Radiation Safety Officer

5.1 The RSO shall oversee safe handling and use of licensed material. The RSO is a member of the USGS Safety line organization and functions independently of, but in cooperation with, the RSC. Major actions and recommendations of the RSO are typically reported to the RSC. The RSC shall record these actions and recommendations, with the response, in the minutes of the RSC Meeting following reporting by the RSO.

5.2 To assure the technical competence of the RSO, the minimum qualifications for the position are:

a. A master's degree in health physics or its equivalent;

b. Five or more years professional experience as a "qualified expert" in radiation protection; that is:

> "...a person having the knowledge and training to measure ionizing radiation, to evaluate safety techniques, and to advise regarding radiation protection needs such as persons certified in this field by the American Board of Radiology, the American Board of Health Physics or those having equivalent qualifications;"[1]

c. Areas of competence to include the use of licensed material for research purposes, use of sealed sources, and transportation and disposal of licensed materials.

5.3 The RSO will provide services necessary for regulatory compliance, and radiation protection for personnel and the environment, and advice and assistance on radiation safety and regulatory issues. The RSO shall provide information to interested USGS, employees concerning the appropriate USNRC regulations under which the RAML is operated. The RSO shall also provide, when requested, guidelines for assuring safe use of licensed materials in specific operations. The RSO is the typical point-of-contact for communications to the NRC.

5.4 The RSO shall review proposed uses of licensed materials as covered by the Permits. The RSOshall consider at least the safety aspects of the proposed activity, adequacy of training of the individuals concerned and suitability of available equipment, space,

---

[1] Definition taken from NRCP (1976) "Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies up to 10 MEV"; NRCP Report #49.

and facilities for safe conduct of the specific applied use of licensed material and approve all Use Permits prior to issuance.

5.5 The RSO will conduct radiation safety surveys at his / her discretion to insure that work is being conducted in a safe manner, in accordance with approved procedures, regulatory compliance, good practices and other conditions as stated in the ALARA and Use Permits. The RSO shall perform a documented inspection of User Permits and facilities including a review of dosimetry reports, and pertinent exposure rate and wipe surveys at least every six (6) months. One such inspection shall coincide with Use Permit renewal applications. The RSO shall then submit a written report to the RSC. This report, and actions and conclusions of the RSC in relation to the report, shall be made a part of the RSC records.

5.6 The RSO or ARSO shall provide support in response to any radiological emergency.

5.7 The RSO shall receive and review all personnel dosimetry reports and report his/her findings to the RSC. The report is to include a response from appropriate personnel for all significant exposures, when the exposure is deemed significant as established by the RSC or by the RSO.

5.8 The RSO or designee shall provide radiation safety training as needed. This training shall include no less than four hours of instruction per year. The topics to be covered shall include but not be limited to general radiation safety, safe use of licensed material, and monitoring techniques.

C. RADIATION USE PERMITS

1.0 General

Each project involving the use of licensed materials must describe the proposed use in a Radiation Use Permit prior to receipt of the associated licensed materials by the User. The Radiation Use Permit must be submitted to the RSC and approved by the RSO and RSC prior to use of the associated licensed materials.

2.0 Issuance of Permits

The RSC shall approve an application for use of licensed materials only after it has deliberated and determined that the expected radiation hazards will be safely controlled in accordance with federal regulations and current standards of good practice, and that the individuals involved are qualified by the virtue of training and experience as specified in Title 10, Chapter 1, CFR, Paragraph 30.33 to conduct the operations specified in the application in such a manner as to protect health and minimize danger to life and property.

The RSC shall not grant approval of Permits with time periods beyond the stated expiration date of the USNRC License under which it operates.

Permits generally will be issued for a period of twelve months, beginning January 1st and ending December 31st of the same year. New Permits may be issued for any period not to exceed eighteen months to facilitate obtaining a common anniversary date.

2.1 All individuals desiring RSC approval must submit a formal application on the form approved by the RSC containing sufficient information to enable the RSC to make an evaluation. The signed application (see Appendix B) shall be submitted to the RSO in sufficient time to allow adequate deliberation and investigations by the RSC.

2.2 Only those employees with prior training in general radiation safety and experience in the intended uses of licensed materials will be approved as Users on Radiation Use Permits. Training shall include principles and practices of radiation protection, radioactivity measurement, standardization, monitoring techniques and instruments, mathematics and calculations basic to the use and measurement of radioactivity, and biological effects of radiation. A "Training and Experience Form" is reproduced in Appendix C.

2.3 The Permit application must include operating procedures sufficient in detail as to allow the RSO and RSC to determine and evaluate potential impacts on personnel and the environment. These procedures must include a description of how the licensed materials will be used and methods of personnel protection. A description of collection and containment of waste awaiting disposal is required. If transport of sources or material is necessary, packaging and handling must be described in detail.

2.4 The Permit application must include an ALARA (as low as reasonably achievable) statement. In this statement the Principal User will include methods and procedures that will be used to minimize unnecessary exposure to individual workers and to the whole worker population.

2.5 Conditions for the conduct of the proposed operations will be specified in the Radiation Use Permit. These conditions will be binding upon the User and his/her line management. Noncompliance with any of these conditions shall be considered as sufficient grounds for the RSO orRSC to immediately suspend a Use Permit, in total or in part, until compliance can be achieved. When a Use Permit is suspended, all associated licensed materials shall be placed in secure storage. Work under the Use Permit shall not commence until the Use Permit is re-approved by the RSO and RSC In the event that the RSO or RSC denies a Use Permit application, the application may be revised and re-submitted for approval.

3.0 Permit suspension, renewals, and amendments

3.1 Any suspension of a Permit-regulated activity by the RSO or the RSC for non-compliance of safety conditions may be appealed to the RSC. Such appeal shall be made in writing within 60 days of any such action. Provision shall be made under the direction of the RSO or their designee for safe storage of any licensed materials

during the period of such suspension. Upon completion of a project or termination of a Permit, the Principle User is responsible for proper disposal of all licensed materials and waste, or provide for their transfer to another Principle User or to an individual or institution covered by a USNRC or equivalent state license. All disposals and transfers must receive prior approval of the RSO or their designee acting on behalf of the RSC. If the User cannot or does not comply with this provision, the licensed materials will become the property of the RSC. The User's supervisor will be notified of such action and will be given an opportunity to provide for an approved transfer of the materials. In the event no such transfer is made, the RSC shall arrange for disposal of said material as soon as possible.

3.2 Applications for Permit renewal (see Appendix B) shall be submitted annually by November 1st for timely action. Renewal application for existing Permits will be acted upon in a manner befitting a new Permit application. All provisions of Part I, Section C, 2.0 apply.

3.3 Amendments may be made at any time to existing Permits upon application to the RSC. Applications for amendments to Permits shall be submitted to the RSC in writing and shall contain sufficient information as referred to in Part I, Section C, 2.0. In no case should any activities beyond the scope of the issued Permit be conducted until an amendment has been approved by the RSO and RSC.

4.0 Permit and facilities inspection

4.1 Principal Users have the responsibility to insure the continuing safe use of licensed materials in the laboratories under their control. Typically this responsibility is fulfilled by the routine performance and documentation of radiological surveys in all work areas. Additionally, the RSO will conduct radiation safety surveys at various times as necessary to insure that work is being conducted in a safe manner in accordance with recognized procedures and practices and specific procedures stated in the Permits. The RSO shall review compliance with work Permits and perform an inspection of User facilities every six (6) months, including a review of radiation surveys performed for each laboratory. One such inspection by the RSO shall coincide with Permit renewal applications. The RSO's findings from these reviews and inspections shall be submitted to the RSC and made a part of the RSC records with appropriate action taken and recorded.

4.2 Sealed sources containing licensed material shall not be opened or removed from their respective source holders by USGS personnel; and each sealed source containing licensed material other than gaseous radionuclides and with a half-life greater than 30 days shall be tested for leakage and/or contamination at intervals not to exceed six months. A physical inventory of the sealed source shall be made at 6-month intervals. In the absence of a certificate from a transferor indicating that a test has been performed within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested and the use approved by the RSO.

4.3 Survey instruments shall be calibrated at 12-month intervals.

4.4 A copy of any results of sealed source wipe tests and meter calibration shall be maintained in the RSC records.

D. PROCUREMENT, RECEIPT, INVENTORY, WASTE TRANSFER, AND DISPOSAL OF LICENSED MATERIALS: RECORDS

1.0 General

No USGS personnel shall procure or possess licensed materials or licensed devices from commercial vendors without prior approval of the RSO or the RSC.

2.0 Procurement

All requisitions for procurement of licensed materials from commercial vendors must be approved by the RSO or the RSC Secretary. Approval will appear as an appropriately signed statement attached to the request as follows: (1) For project-level credit card purchases, submit the original plus one copy of the request (Appendix H) to the Secretary prior to ordering. (2) For bureau-wide requisitions, submit each requisition to the Secretary prior to processing by the USGS Administrative Division, Procurement and Contracts Section. The signed statement reads as follows:

The procurement, possession, use, and disposal of this licensed material is covered by Permit #_____.
and by USNRC License #_____.

Approved by _____.
Secretary, Menlo Park, CA
Radiation Safety Committee.

Note: Unless otherwise specified in the Permit Conditions, this shipment must be delivered to:

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

Attention: _____.
User named, Permit # _____.
User named, Phone # _____.

2.1 Before procuring licensed materials, Users must verify that their Permit provides authorization for the type and amounts of specific licensed materials being requested.

Current inventories must be considered. Requisitions for licensed materials are to be routed through the RSC Secretary or RSO for verification against the inventory and approval.

3.0 Receipt

The RSC will only authorize Users to receive their own licensed materials. Packages received by the Mail Room (345 Middlefield Road, Menlo Park) must be removed immediately. The "Radioactive Material Receival Record" in Appendix H shall be adhered to when receiving licensed material. All relevant records of licensed material received shall be sent to the Secretary.

4.0 Inventory

4.1 Each Principal User shall maintain a current written and electronic inventory and make an annual physical inventory of licensed material in his/her possession or under his/her control. A copy of this inventory shall be submitted to the RSO as part of the User's Permit renewal application. The effective date of the inventory must be within 30 days of the application date. This annual inventory shall contain the following information:

a. Physical location and means of control (security).

b. Ownership/responsibility and specific name of the person to whom the licensed material has been issued.

c. Type, form, and quantity of licensed material in possession including the date of activity measurement.

d. Permit number under which use is authorized.

4.2 A detailed inventory is also required of any User when operation authorized by his/her Permit are terminated and the Permit becomes inactive. This inventory shall contain the same information required in Part I, Section D, 4.1.The Principle User is responsible for the licensed material until the Use Permit has been terminated by the RSC and RSO.

5. Waste transfer to the Waste Storage Facility

All relevant records of licensed waste transfer from the Permit to the RSC's Waste Storage Facility shall be sent to the RSO. The records provided shall include an inventory of each isotope and corresponding quantity transferred from the Permit. Waste Transfer Forms are available from the RSO. One copy of the waste transfer record should be retained by the generator of the waste and the RSC until such a time that a final disposal occurs.

6.0 Disposal

Documentation of any known release of licensed material to the environment, whether authorized or unauthorized, shall be sent to the RSO, identifying the isotopes and quantity if possible. The RSO shall use this information to maintain an inventory and assure that allowable limits on releases to the sanitary sewer or hood exhausts as reported are not exceeded (see Part II, Section A, 5.0). No intentional release of licensed material to the sanitary sewer or hood exhaust shall be made without prior approval of the RSO and RSC.

E. DOSIMETRY RECORDS

1.0 General

Criteria for issuance of personal dosimetry to personnel working with licensed material are stated in Section II.A.2.2 of this manual. Personnel working below these limits may be issued dosimeters at the discretion of the RSC with the approval of the RSO. Such persons shall wear dosimeters when working in restricted areas,. This includes Users and Handlers. Non-Users may also request dosimetry and voluntary training if working in restricted areas with the approval of the RSO.

2.0 Types of personal monitoring equipment

Personal monitoring equipment shall be issued at the discretion of the RSC with the approval of the RSO. The decisions regarding the need for dosimetry, the type(s) of dosimetry required, and the exchange/evaluation frequency will be based on regulatory requirements and professional judgment of the RSC and RSO.

3.0 Monitoring frequency

Solid state (TLD) personal dosimetry is normally collected by the RSO or designee on the 30th of the appropriate month, at which time new badges are distributed for the upcoming period.

4.0 Reports

All solid state (TLD) dosimetry reports shall be sent to the RSO or designee in a timely fashion by a contractor selected by the RSC. The contractor shall be accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). One copy shall be maintained by the RSO, and one copy shall be distributed to the Principal Users by the RSO. All records will be maintained until the RAML is terminated by the NRC.

5.0 Doses

The RSO shall discuss inconsistencies, late badges, and significant doses with project personnel at the discretion of the RSO or RSC. Response by appropriate personnel shall be made by memo through the Principal User to the RSO. A record of all exposures greater

than 25 millirem shall be kept by the RSC, evaluated by the RSC, and the conclusions recorded in the minutes of RSC meetings. Doses over limits approved by USNRC shall be reported to the USNRC by the RSO.

F. TRAINING

1.0 General

All personnel working with licensed material shall receive radiation safety training.

2.0 Requirements

New Users and Handlers must receive 4 hours of training before beginning work with licensed materials. Initial training must be commensurate with, and new trainees must read and sign, 10CFRPart19.12: Instruction to Workers. Additional general guidance for training is provided in NUREG 1556 Vol.7. Both documents are included in Appendix J of this manual and can be accessed on the web. Initial training shall also include reviewing the Radiation Safety Manual and individual Permit record keeping responsibilities and procedures. Initial training must be documented in a memo to the RSO that states training activities, the number of hours spent at each activity, and the dates of the training.

Users and Handlers are required to have periodic refresher training. Users and Handlers are required to have 4 hours of training within the two years preceding the current quarter. If training lapses, radiation workers are not permitted to work with licensed materials until the training requirements are met. Current documented verification of this requirement shall be maintained in the records of the Permit and RSC.

Training shall include special regulations, exposure limits, guidelines, and procedures pertaining to a declared pregnant worker. Women of child-bearing age shall be made aware of increased risks to the fetus. Radiation workers of child-bearing age who wish to declare a pregnancy shall sign and submit a record declaring pregnancy to the Principle User or RSO.

3.0 Accrual of training hours

The RSC ensures that radiation safety training is provided annually and that DOT training is provided bi-annually. If training lapses between courses, with the prior authorization of the Principal User, Users and Handlers may alternatively accrue hours by reviewing the Radiation Safety Manual and requirements of the USNRC License, studying applicable portions of the CFR, such as 10 CFR 19.12, 20, and 49 or Nureg 1556 Vol. 7, and/or studying appropriate outline material or video training material approved and supplied by the Principal User, RSO, or their designee.

Other arrangements include but are not limited to:

- Developing protocols for handling licensed materials

- Orientation to the radiation safety program
- Review of isotope records and handling procedures
- Review of dosimetry
- Review of disposal procedures
- Review of ALARA statements
- Review of Permit files during semiannual Permit and facilities inspection
- Review of licensed material security
- Approved on-line training courses

4.0 Documentation

If training is not provided by the RSO, that training shall receive the prior approval of the RSC or RSO, and the RSO shall be provided with a written statement of the completion of training. This statement must include the subject matter and topics covered, type of training (classroom, OJT, etc.), the dates that the student participated in the training, and the total hours of training received.

II. RADIATION PROTECTION

A. GENERAL

1.0 Use of licensed materials

With the exclusion of human use, licensed materials may be used for a variety of studies within the USGS, MP laboratories upon approval by the RSC. Such uses may include, but are not limited to, the following:

(1) Research and development using licensed materials in tracer studies with plants and animals.

(2) Analytical procedures including but not limited to radiochemistry, activation analysis, instrument calibration, and radiation dosimetry studies.

(3) Use of sealed sources of radiation for field and laboratory studies of hydrologic phenomena.

Users should consult the RSO or RSC for the most current information on uses approved by the RAML.

2.0 Radiation dose limits

Radiation sources will be used in such a manner that they will not constitute a real or potential hazard to personnel and property beyond the lowest practicable limits in accordance with the regulations established by the USNRC. These radiation protection standards and the basis for their formulation are embodied in current regulations and recommendations contained in Title 10, CFR, Part 20. They will serve as a foundation in establishing any radiological safety program serving the needs of USGS, MP. Even though the regulations establish upper limits for personnel exposure, each licensee is required to have an active program to ensure that personnel exposures are kept "as low as reasonably achievable" (ALARA). Users must ensure that their personnel are trained in personnel protection and exposure limiting procedures. Unless otherwise specified in this manual or in the ALARA statement of the individual Permit, the procedures for the safe use of radionuclides and emergencies as published in Appendix R of NUREG-1556, Volume 11 shall be followed by all Permits.

2.1(A) For personnel regularly assigned to restricted areas ("radiation workers") the external whole body radiation dose (annual TEDE or total effective dose equivalent) generally shall not exceed the following:

Time Periods	Rems
Yearly	5.0

2.1(B) The dose rate in unrestricted areas shall be < 2 mrem/hr. In addition to the above limits, the annual exposure limits identified in 10 CFR 20.1201 (Subpart C) shall be in effect: the sum of the deep-dose equivalent (DDE) and the committed dose equivalent (CDE) to any individual organ (other than the lens of the eye) shall not exceed 50 rems; an eye dose equivalent (LDE) of 15 rems; a shallow-dose equivalent (SDE) of 50 rems to the skin or any extremity. The product of the sum of internal and external committed effective doses shall not exceed the annual TEDE specified in section 2.1 above. The USGS, MP must reduce the annual allowable dose to an individual by that amount of occupational exposure already received in the current calendar year.

2.2 All personnel and visitors who might reasonably be expected to receive a radiation dose exceeding 1/10 of the dosage specified in Part II, Section A, 2.1 (above), shall wear personnel monitoring equipment (i.e., film badges, ring badges, pocket dosimeters, or thermoluminescent (TLD) dosimeters) at all times when there is a reasonable possibility of such radiation exposure.

2.3 If the radiation protection standards indicted in Paragraph 2.1 of this section should be exceeded for any reason, the individual of concern must have his/her work schedule adjusted so that he/she does not exceed the radiation dose limitation for the next specified period. Such restriction of activity shall remain until his/her radiation dose is within acceptable limits as outlined above. Any such excessive radiation dose to an individual shall be promptly reported to the RSC in writing.

2.4 Female employees working with licensed materials who suspect a pregnancy or who have confirmed a pregnancy may voluntarily declare their pregnancy by contacting the Principle User or RSO. The RSC encourages the discussion of reproduction hazards from laboratory and licensed material use. MPRSC training shall include special regulations, exposure limits, guidelines, and procedures for declaring a pregnancy. Work restrictions may be imposed depending upon the potential for exposure to the embryo/fetus. By regulation, the total exposure to the embryo/fetus is limited to 500 mrem for the duration of a declared pregnancy. A declaration of pregnancy form is available as a download in Quickplace or from the Principal User.

2.5 Exposure to minors under age 18 is discouraged, however, no minor shall be permitted to be exposed to doses greater than 1/10 of those listed in Part II, Section A, 2.1.

2.6 Personnel occupational dose derived from concentrations of radioactive material in air and/or from ingestion (CDE) shall not exceed the annual limit on intake (ALI) for one or more isotopes, subject to the determination methodology specified by part 20.1204 of the CFR. The product of the sum of internal and external committed effective doses shall not exceed the annual TEDE specified in section 2.1 above. If it is determined that these limits have, in fact, been exceeded, potentially exposed individuals shall submit appropriate bio-assays for radioactive material if deemed necessary by the RSO.

2.7 Prescribed limits for airborne and water released licensed materials to unrestricted areas, based on an the ALI for individuals and referred to as derived air concentrations (DAC), are specifically outlined in Title 10, CFR, Part 20, Appendix B. The RSO shall be informed immediately in writing of all controlled or uncontrolled releases of licensed materials to the environment that exceed 1/10 of these limits.

3.0 Responsibility of Users

The responsibility of providing day-to-day operations to assure radiation safety shall rest with the Principal User or User as specified by the Permit. The Permit is the vehicle whereby this responsibility is delegated to the Principal User. Annual review of Permits by the RSC followed by inspections every six month, as described in Part I, Section B, 5.6, will serve to assure compliance. The individual who supervises the use of licensed material has, in addition to his/her usual duties, the following specific responsibilities:

a. To be aware of the nature and hazards of ionizing radiation.

b. To enforce the radiation protection rules of the Permit, this manual, including Appendix A, and Title 10, Chapter 1, CFR.

c. To assure that necessary equipment for the safe use of licensed material is available in good operating condition and, where appropriate, in current calibration.

d. To provide adequate facilities as described in Part 15 of Appendix A (page A-3) to this manual commensurate with the quantities of licensed material used.

e. To immediately report all radiological health emergencies to the RSO.

f. To inform new employees of radiation protection procedures prior to their use of any licensed material. This also applies to all individuals who may have occasion to enter restricted areas.

g. To see that use and disposal of licensed materials are conducted in accordance with the provisions contained in this manual and the appropriate use Permit.

h. To provide adequate security to reasonably prevent access of unauthorized individuals to restricted areas.

i. To assure that all sealed sources of licensed material above the limits specified in Condition 16 of the License are leak tested to insure containment of the licensed material. Copies of leak test records will be sent to the RSO. Such leak testing shall be accomplished at intervals no greater than every six months as outlined in Part II, Section A, 3.9 of this manual.

3.1 Individuals working with licensed material must be familiar with the potential hazards involved, the procedures and requirements described in this manual and the appropriate Permits, and have the training commensurate with the operations being undertaken. Therefore, it shall be the responsibility of the User to insure that no employee under his/her supervision is permitted to work with licensed materials until he/she has had at least 4 hours training in the areas of radiation safety so as to permit him/her to use such materials safely (See Part I, Section F, 2.0). The User shall insure that no employee shall be permitted to handle licensed materials until they are thoroughly aware of the detailed regulations pertaining to their particular applications as outlined in this manual and the appropriate Permit. Specifically, Users shall be able to provide the following to workers under their supervision:

a. Adequate training to ensure competent use of licensed material including the health protection aspects of the required uses.

b. Updated training as required by changes in procedures, equipment, regulations, etc.

c. Information regarding storage, transfer or use of licensed materials or of radiation in restricted areas frequented by such workers.

d. The following documents:

(1)Title 10, CFR; Parts 19 and 20, 30, and 71, and 49 CFR 172-177; (2) the Permit and associated documents included by reference; (3) this manual; (4) copy of the License; (5) any notice of noncompliance and any response from the User; (6) Form NRC-3, "Notice to employees"; (7) radiation dosimetry reports and reports of any bioassay results.

e. The opportunity to attend refresher training courses and seminars.

3.2 Permits will be issued to specific individuals by name. Operations conducted under each Permit must be done by or under the supervision of such named individuals.

3.3 All individuals working with licensed materials must be provided with appropriate monitoring equipment as specified in Part II, Section A, 3.0 (c). In addition, bioassay services may be made available at the discretion of the RSC and RSO (e.g. when widespread contamination has occurred in a laboratory or when skin contamination has occurred) to determine if personnel have ingested or inhaled radioactive material and mitigate its effects. (See Part II, Section A, 2.6). Bioassays may also be required when working with ^{3}H and ^{125}I (see Appendix A - 7 and 8).

3.4 Principal Users are required to provide appropriate notifications of various items as indicated in this manual and specifically must notify the RSO of any noncompliance items noted by them where procedures outlined in this manual, including Appendix A or any issued Permit, have been directly or indirectly violated.

3.5 Radiation surveys of various types and frequency shall be required depending upon the specific use of licensed materials. Unless otherwise specified in this manual or in the ALARA statement of the individual Permit, the procedures for the taking of radiation surveys and leak testing as published in Appendices S and T of NUREG-1556, Volume 11 shall be followed by all Permits. For each laboratory under his/her control, it is the User's responsibility to make or have made and keep current, records of routine or special area radiation surveys including surveys to determine radioactive contamination, which shall be kept as low as practicable. Such records must include documentation of ongoing laboratory cleanliness, any identified fixed and /or loose surface contamination, records of spills and records of the results of post-cleanup surveys, closeout surveys, documentation of particular licensed materials used in a laboratory (including quantities subdivided), and records of types and amounts of licensed materials disposed. It should be noted that radiation surveys are required to detect the particular form of radioactive contamination which one could reasonably expect to find based upon the radionuclides being used. Survey documentation (including counting data sheets) shall include information on type(s) of instrumentation utilized, their calibration dates, calibration efficiencies, and use limitations where specified. Users of unsealed sources of licensed material shall make routine surveys including area monitoring and wipe tests in all restricted areas under the User's control. The frequency of such surveys shall be stated in the appropriate Permit ALARA and shall be made at least monthly unless no use has occurred. (See Part II, Section A, 3.9 of this part for sealed sources). In addition, the user of such material shall conduct appropriate radiation surveys in adjacent, unrestricted areas to ascertain that appropriate limits are being met. Limits for removable contamination and maximum radiation dose rates shall be as follows:

a. Unrestricted areas:

   Removable surface contamination shall be less than 200 disintegrations per minute (DPM) Beta-Gamma and 20 DPM Alpha for a "wipe" covering any 100 cm^2 area. Maximum radiation levels shall be less than 0.5 mrad per hour at any surface exclusive of approved U. S. Department of Transportation (USDOT) shipping containers. Fixed surface contamination shall be less than 0.1 mrad per hour Beta-Gamma activity (as measured by a calibrated thin end-window G-M Survey Meter) or 50 counts/minute (CPM) Alpha (as read by an appropriate Alpha monitor).

b. Restricted Areas:

   Removable surface contamination shall be less than 1,000 DPM Beta and 100 DPM Alpha activity for a "wipe" covering any 100 cm^2 area. Radiation dose rate shall be less than 2.5 mrad/hr general work area (exclusive of the inside of hoods, glove boxes, and shielded enclosures which may have higher limits if specifically stated in an appropriate Permit).

3.6 If routine area surveys indicate that levels at any time exceed the limits specified in Part II, Section A, 3.5 above as confirmed by duplicate surveys, all operations in the affected laboratory area shall cease immediately until the area is decontaminated and appropriate control measures are taken.

3.7 Records of radiation surveys and decontamination results shall be inspected as part of the six-month inspection described above (Part I, Section B, 5.6).

3.8 Principal Users shall maintain such records as to thoroughly document all operations conducted under the operation of their respective Permits. Such records shall be available for inspection at any time by USNRC inspectors, the RSC, the RSO, or personnel conducting operations documented by such records. User records shall include but are not limited to:

a. Permit applications, Permits, Permit amendments and renewals.

b. Procurement records including monitoring results of received shipments of licensed material. (see Part I, Section D).

c. Detailed annual inventory as specified in Part I, Section D, 4.1 as well as such other records to respond to inquiries concerning the current status of licensed material in the User's possession or under his/her control.

d. Records of transfer or shipment of licensed material.

e. Records of waste disposal including the information detailed in Part I, Section D, 5.0.

f. Records of radiation surveys conducted to check for radioactive contamination and radiation exposure levels.

g. Records of leak tests of sealed sources as required in Part II, Section A, 3.9.

3.9 Sealed sources containing licensed material shall not be opened or removed from their respective source holders by the licensee; and each sealed source containing licensed material other than gaseous radionuclides and with a half-life greater than 30 days shall be tested for leakage and/or contamination at the frequency specified in the sealed source device registration certificate or, if not tendered on the certificate, at intervals not to exceed six months. In the absence of a certificate from a transferor indicating that a test has been performed with six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.

Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak test when the source contains less than 100 microcuries of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

The periodic leak test required by this condition does not apply to sealed sources that are securely stored and are not being used. The sources excepted from these tests shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.

Leak tests shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surface of any device in which the sealed source is permanently sealed or stored at which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection.

If the tests reveal the presence of 0.005 microcuries or more of removable contamination, the User shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or be disposed of in accordance with USNRC regulations. A report shall be filed through the RSO who, within five days of the test, shall notify the following USNRC offices:

US NRC, Region IV
Attn: Director Division of Nuclear Materials Safety
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

Such information shall describe the equipment involved, the test results and any corrective action taken.

Tests for leakage and/or contamination shall be performed only by Users or other persons who are specifically authorized either by virtue of a specific statement in a Permit or by a separate USNRC License or a specific license issued by an agreement statement to perform such services.

4.0 Storage of licensed materials

Licensed materials shall be secured against unauthorized removal from the place of storage. Storage shall be done in such a manner that no person is likely to receive a whole body dose greater than 2 mrem per hour or 100 mrem per year or to be exposed to air or water concentrations in excess of the levels specified in Title 10, Chapter 1, CFR, Part 20, Appendix B, Table 1, (i.e., the Table of Maximum Permissible Concentration of Radionuclides in Air). All such storage of licensed materials shall be appropriately labeled externally as to the quantity and type of stored licensed materials and external radiation dose rate.

The RSO shall perform a public dose assessment demonstrating compliance with the general public that no one is likely to receive a whole body dose rate greater than 2 mrem per hour or 100 mrem per year.

Each area or room in which licensed material is used or stored and which contains any licensed material in an amount exceeding 10 times the quantity of such material as specified in Title 10, Chapter 1, CFR, Part 20, shall be conspicuously identified with a sign displaying the magenta and yellow radiation sign (10 CFR, Chapter 1, Part 20, Section 1901) and bearing the words "Caution Radioactive Material".

Containers of licensed material shall bear a durable, clearly visible label identifying the radioactive contents and shall bear the radiation caution symbol and words "Caution Radioactive Material" or "Danger Radioactive Material". It shall also provide sufficient information to permit individuals handling or using the containers or working in the vicinity thereof to take precautions to avoid or minimize exposure. Although such labeling is not specifically required for containers with less than the quantity specified in Title 10, Chapter 1, Part 20 of the CFR, labeling of even small quantities of licensed material is to be encouraged.

Radioactive gases and materials with radioactive gaseous daughter products (such as radium and radon) shall be stored in gas-tight containers and kept in areas with adequate ventilation, specifically ventilation hoods. Unsealed sources shall be stored in such a manner as to contain the licensed material in case of spillage or breakage of the primary container.

5.0 Licensed waste disposal

5.1 Solid licensed-material waste shall be disposed of by transfer to an authorized radioactive waste disposal agency.

5.2 Liquid licensed-material waste, including the first rinse from decontamination of equipment or lab ware, shall be disposed of by transfer to an authorized radioactive waste disposal agency. If disposal of liquids to sanitary sewers and/or hood exhaust should occur, the limits specified by Title 10, CFR, Part 20, Appendix B shall not be exceeded. (Note: for some unknown isotopic mixtures, sewer disposal of licensed material is limited to 4×10^{-4} microcuries/ml or 880 DPM per liter.)

5.3 No intentional release of licensed material to the sanitary sewer or hood exhaust shall be made without prior approval of the RSC. Any known release of licensed material to the sanitary sewer must be documented and a record sent to the RSO. The Principal User with the aid of the RSO shall make all appropriate sink disposal calculations as required for the RSC records by the USNRC. Documentation of licensed material quantities transferred to storage for decay shall be maintained in the appropriate Permit file (See Appendix I).

5.4 Storage of licensed material wastes pending disposal shall conform to the same regulations applied to licensed material as specified in Item 4 above. Additionally, licensed material transferred to storage under an approved “Hold For Decay”

program (see Appendix I) shall be double - contained (redundant sealed barriers) so as to further reduce the potential for leakage to clean areas during the storage cycle.

5.5 Each project creating licensed material wastes shall have at least one specialized radioactive waste container readily available. This container shall be labeled as containing radioactive waste and display both the radiation warning symbol and the words "Caution Radioactive Materials." A list of the quantity of radioisotopes present in the container must be maintained for inclusion on the disposal certification.

5.6 Licensed material waste must be packaged according to Title, 10, CFR, Part 71 and Title 49, Part 173. Shipping forms including certification must be completed before the disposal company will accept the waste. The RSO can be contacted for additional information.

6.0 Radiation incidents and emergencies

6.1 The term radiological health emergency shall apply to any incident pursuant to the use of licensed material which produces or is likely to produce a significant radiation exposure to an individual or which produces contamination of personnel and/or areas exceeding 10 times the levels specified in Part II, Section A, 3.5. Such emergencies involving licensed materials might be caused by incidents such as breakage of licensed material containers, fire, explosion, or accidental release of licensed material. Such radiation incidents normally have the same impact as accidents and emergencies sometimes encountered with the additional impact that radioactive materials or excessive radiation exposures may also be involved. In the event of such an emergency the following general procedures shall apply.

a. Medical care of any injured persons will normally take precedence over decontamination procedures and/or protection of property.

b. Emergency medical attendants shall be made aware of potential radiological contamination.

c. The RSO shall be advised immediately by the User of any incident.

d. The User responsible for operations and for personnel involved in a radiological emergency shall have the primary responsibility for implementing emergency response procedures and decontamination operations. This shall be done under the supervision of the RSO. In the event of the Users incapacitation or unavailability, the RSO shall designate another User to assume the primary responsibility described above.

6.2 In the event of a radiological emergency which results in the escape of licensed material beyond a restricted area, employees shall take the following precautions:

a. Secure the area and immediately notify the RSO, providing the quantities and radionuclides involved, number of affected personnel and extent of the release.

b. If indicated, erect barriers, post signs and establish guards to minimize the spread of radioactive contamination.
c. Survey the area, using appropriately calibrated radiation survey instruments.
d. The User, or individual designated specifically by the User, must remain at the scene until relieved by someone designated either by the RSO or the User or until such time as the spread of radioactive contamination is reduced to acceptable levels.

6.3 Primary consideration in an emergency involving radioactive contamination lies on confining the spread of the contamination to as small an area as practicable and keeping personnel exposures to a minimum. This can frequently be accomplished by the following procedures:

a. Secure the area pending arrival of the RSO. Do not allow anyone to enter a contaminated area without protective clothing, including lab coats, shoe covers, and gloves.
b. Assist personnel to move out of the contaminated area. All contaminated items shall be left in the contaminated area. If possible, create a pathway with floor covering to a low background area and assist the egress of affected personnel.

b. When affected personnel have been relocated to a low background area, provide clean footwear and external clothing and perform a contamination survey using appropriate calibrated instruments (normally a simple Geiger counter with audible output). If contamination is found, simple decontamination can begin by gently wiping the contaminated area with a wet soapy cloth. All decontamination materials shall be segregated and held for the RSO.

c. Minimize the spread of radioactivity to personnel and the environment. Instruct personnel to sit quietly and await the RSO. Personnel should keep their hands away from their facial area. Contamination spread can normally be stopped using barriers, absorbers, and similar devices.

d. Control of contaminated clothing, equipment and potentially contaminated items.

6.4 The RSO is required to provide notification to the Director of the USNRC Regional Office.

a. Immediate notification of any incident involving byproduct, source, or special nuclear material which may have caused or threatens to cause:

(1) Exposure to an individual equal to or greater than a total effective dose equivalent of 25 rems (0.25 Sv); or

(2) An eye dose equivalent of 75 rems (0.75 Sv) or more; or

(3) A shallow-dose equivalent to the skin or extremities of 250 rems (2.5 Gy) or more; or

(4) The release of licensed materials inside or outside of a restricted area, so that, if an individual were present 24 hours, that individual could have received an intake five time the annual limit on intake (provisions in this paragraph do not apply to locations where personnel are not normally stationed during routine operations, such as hot cells).

b. Twenty-four hour notification of any incident involving licensed material which may have caused or threatens to cause:

(1) Receipt by an individual of a total effective dose equivalent of greater than 5 rems (0.05 Sv); or

(2) An eye dose equivalent exceeding 15 rems (0.15 Sv); or

(3) A shallow-dose equivalent to the skin or extremities exceeding 50 rems (0.5 Sv); or

(4) The release of licensed material, inside or outside of a restricted area, so that, if an individual were present for 24 hours, that individual could have received an intake in excess of one occupational annual limit on intake (the provisions of this paragraph do not apply to locations were personnel are not normally stationed during routine operations, such as hot cells).

c. In addition to the reporting requirements above, a written report is required within 30 days after learning of any of the following occurrences:

(1) Any incident for which notification is required by 10 CFR 20.2202; or

(2) Doses in excess of occupational dose limits for adults in 10 CFR 20.1201; or

(3) Doses in excess of occupational dose limits for a minor in 10 CFR 20.1207; or

(4) Exceeding the limits for an embryo/fetus of a declared pregnant woman in 10 CFR 20.1208; or

(5) Exceeding the limits for an individual member of the public in 10 CFR 20.1301; or

(6) Exceeding any applicable concentration of licensed material, radiation level, or exposure limit for a restricted area, as specified in the License; or

(7) Exceeding a radiation level or concentration of licensed material for an unrestricted area that is 10 times any applicable limit set forth in part 20.2203 or in the License (whether or not involving exposure in excess of the limits in part 20.1301); or

(8) For licensees subject to the provisions of EPA's generally applicable environmental radiation standards in 40 CFR 190, levels of radiation or radioactive releases in excess of those standards, or of License conditions related to those standards.

d. Contents of reports under part 20.2203

(1) Each report required by this part must describe the extent of individual exposure(s) to radiation and licensed material, to include as appropriate estimates of each individual dose, levels of radiation and licensed material concentrations involved, causes of the elevated exposures, dose rates, or concentrations, and corrective steps taken or planned to prevent a recurrence, including the schedule for achieving conformance with applicable limits, standards, and associated License conditions.

(2) Each report filed pursuant to any aforementioned requirement(s) must include for each individual exposed, the name, Social Security number, and date of birth. The report must be prepared such that this information is stated in a separate and detachable part of the report.

(3) All licenses who make reports under this section shall submit the report in writing to the USNRC, Document Control Desk, Washington, DC 20555, with a copy to the appropriate USNRC Regional Office.

7.0 Transportation of licensed materials

Licensed materials may be transported beyond restricted areas provided they are in sealed and approved USDOT shipping containers as defined in Title 49 CFR. In no case should licensed materials be transported beyond restricted areas in open containers. All transportation of licensed materials over public highways must meet the regulations of the USDOT as described in Title 49 CFR as to packaging, labeling, and other identification. In general, such shipping requires a strong container capable of containing all licensed materials under conditions normal to transportation which will not, under such conditions, release the licensed material to the environment. Liquids and solutions containing licensed material must be in containers designed such that they will absorb all of the licensed materials in case of breakage of the primary or secondary vessels.

Most, if not all, of the licensed materials subject to transport by USGS over public highways are normal form, Type A quantities shipped via non-exclusive use transport vehicles. Requirements for shipment of materials falling into the aforementioned category are contained in various Subparts of 49 CFR 172-177. It is imperative to note that the

shipping requirements for licensed material NOT falling into the aforementioned category (i.e. normal form, Type A quantity, non-exclusive use transport) are contained in various other sections and subparts of 49 CFR. With respect to exempt quantities, excepted quantities, other Type A quantities, instruments and articles, and due to the complexity of the USDOT regulations, a systematic evaluation and determination of transport and shipping requirements should always be pursued. A brief approach outline with accompanying USDOT section reference(s) is provided below.

a. Determining Material Form/Type (See Definitions 173.403
b. Determining USDOT Subclass 173.424-425, 173.435
c. Determining Proper Shipping Names.....172.101, Table 1
d. Packaging 173.24, 173.410, 173.412, 173.415 & 415a
e. Evaluating Radiation Levels 173.44
f. Determining Contamination Limits.....173.443
g. Marking and Labeling Requirements.....172.101, Table 2, 172.301, 172.304, 172.310, 172.322, 172.324, 172.403, 172.406
h. Placarding 172.502, 172.504, 172.506, 172.516
i. Completing Shipping Papers 172.201-204, 177.817
j. Evaluating Emergency Response Requirements 172.600

The RSO provides support to ensure that licensed materials are packaged and shipped in compliance with USDOT regulations. Users who need or wish to transport and/or ship licensed materials must complete both USNRC and USDOT required training courses. These courses can be provided by the RSO or a qualified contractor. Specific regulations for the safe transport of radioactive and other "Hazardous" materials can be found in the latest editions of Title 10 and Title 49 of the CFR. Specific requirements can vary significantly depending on the form, type, activity, and quantity of material and the desired mode of shipment. Quantities of licensed material exempted from licensing requirements pursuant to 10 CFR 30.14 (see Schedule A) are not necessarily excepted quantities of licensed material with regard to transport, shipping and receipt of same. Classification of licensed materials with regard to packaging and transport is done pursuant to 49 CFR 173, Subpart I (Class 7 Materials). The USGS holds both limited (and excepted) and Type A quantities of licensed material under their current License. Type A and some limited quantities of licensed material, and radioactive instruments and articles, shall be packaged and transported in accordance with the requirements of Subpart I. Excepted amounts of limited quantity licensed material, when transported in a container or by package, must be accompanied with a notice containing the name of the consignor or consignee and one of the certification statements as specified in subpart 173.422 (a). Also, the outside of the excepted container or package shall bear the marking "Radioactive".

7.1 The RSO must be advised of any transport of licensed material in USGS, MP or personal vehicles beyond the confines of a specified site as stated in the Permit.

Such transportation must conform to all of the specific requirements relative to such shipments as defined in 49 CFR, and be approved by the RSO or ARSO.

8.0 Release of licensed material use areas for unrestricted use

None of the use locations identified in Condition 10 of the RAML shall be released for unrestricted use without prior USNRC approval.

APPENDIX A. SPECIFIC REGULATIONS AND DEFINITION OF WORKPLACES FOR HANDLING LICENSED MATERIALS

All handling and processing of licensed materials must be conducted under: (1) regulations which have been issued by the USNRC, (2) the specific requirements stated in the User's Permit, and (3) the following general and specific regulations;

1. Operations involving licensed materials shall be conducted in workplaces which shall be designed and equipped to provide the maximum practical protection of personnel against the hazards of ionizing radiation. Each use of unsealed licensed materials shall be conducted only in a workplace appropriately classified for such use as defined in this Appendix.

2. Approved personal dosimeters will be worn at all times by all individuals specified in Part II, Section A, 2.2 while working in the direct vicinity of a restricted area (See Part II, Section A, 2.2) and/or when working with quantities of beta-gamma emitting licensed materials in excess of 1 millicurie. Finger ring badges will be worn whenever hand processing of more than 1millicurie of beta-gamma emitting radionuclides is conducted.

3. Tests for radioactive contamination shall be performed by taking a "wipe" using a small piece of filter paper or other suitable material and gently wiping or smearing the area of suspected contamination. A "typical" wipe test normally covers an area of approximately 100 square centimeters (except for packages of licensed material presented for transport, for which the wipe area may be 300 square cm, per 49 CFR 173.443) and is used to determine levels of removable radioactive contamination. Such a wipe test is then assayed using an appropriate radiation detection instrument to determine actual radioactivity levels on the wipe sample (See Part II, Section A, 3.5, a&b).

4. When used in a Type II workplace (see Item 16 of this Appendix) exhausts from radiochemical fume hoods will be appropriately monitored to verify that the release of licensed materials to the environment is less than levels specified in Title 10, Chapter 1, CFR. Part 20, Appendix B, whenever there is a reasonable possibility that release of licensed materials in excess of 10 percent of such levels can occur.

5. All vials and containers of licensed materials containing more than the quantities specified in Title 10, Chapter 1, CFR, Part 20, Appendix C, shall be labeled as to quantity and type of radioactive material contained therein, the assay date, and the external radiation level. In addition, any such vials or containers shall conspicuously display the magenta and yellow warning symbol and the words "Caution Radioactive Material."

6. Appropriate protective clothing which may include laboratory coats, gloves, and shoe covers shall be worn by personnel when working with unsealed sources of licensed materials as specified in the Permit.

7. Individuals working with unsealed sources of iodine 125 or 131 exceeding 1 millicurie shall obtain thyroid scans capable of detecting less than 0.1 microcuries of these isotopes at least once each month during any period when these radionuclides are being processed. A

quantitative measurement and evaluation shall be done of the radioiodine contained in the thyroid if such scan levels are above normal background.

8. Individuals processing more than 100 millicuries of tritium (hydrogen-3) in a non-contained form shall have a specific urinalysis done within 1 week following a single operation and at least once every 2 weeks for a continuing operation to determine that the tritium levels in the body are within acceptable levels (20 microcuries per liter).

9. No person shall eat, drink, chew, smoke, store food, or apply cosmetics in the area where unsealed sources of radioactive licensed materials are being used.

10. Hands and shoes shall be monitored for radioactive contamination using an appropriate calibrated radiation measuring instrument whenever leaving an area where unsealed sources of licensed materials are being processed and there is a reasonable possibility of radioactive contamination of personnel and/or clothing. Measurable radioactive contamination shall be removed from hands and clothing before leaving restricted areas.

11. No mouth pipetting will be permitted in laboratories in which licensed material is in use.

12. Exhaust blowers on any glove box containing licensed materials shall be electrically connected in such a manner that the blower of any such glove box exhaust shall not be in the "on" position and operative unless the blower to the hood exhaust or area exhaust to which it is connected is also in the "on" or operational position. Such glove box exhaust systems shall be electrically interconnected to prevent licensed materials from being dispersed other than through an appropriately monitored exhaust.

13. Licensed materials in the approved USDOT shipping containers as defined in Title 49, CFR, may be transported by Users in automotive vehicles providing they have received appropriate DOT training within three years, there is a Bill of Lading and/or certification notice accompanying the materials, the materials are transported in a locked trunk or locked glove compartment or locked container within the vehicle, suitable radiation monitoring equipment is carried in the vehicle, the inside of the vehicle conspicuously posted with written emergency procedures and recommendations including telephone numbers of the RSO, Chairperson, and ARSO, one of whom must be contacted immediately in case of any incident involving the transported licensed material.

14. Given the possibility of receiving a licensed material shipment having undergone damage (either recognized or unrecognized) in transit or being improperly packaged, labeled or received, the following procedures will be followed by all Users upon the receipt, opening, and inspection of licensed material shipments.

    a. Users receiving such shipments will be required to be familiar with and to follow the procedures outlined in Title 10, Chapter 1, CFR, Paragraph 20.1906. Contamination reports to shippers and carriers will be made by the RSO as specified in these regulations with copies kept in the RSC records.

b. In any case where a damaged licensed material shipment is received, note that such federal regulations require immediate notification to the USNRC of receipt of such a package if the outside of the container contains significant removable contamination. Per shipping regulations, USDOT-certified containers of licensed material in receipt may contain removable external contamination as specified in Table 11, 49 CFR 173.443 (a)(2). As a matter of safety and administrative control, however, the limit of external loose surface contamination contained on a Class 7 radioactive materials package received in shipment (commercially packaged or a non-USDOT certified container or package) shall be the same as for normally clean areas of the facility as specified in Part II, Section A, 3.5 (a) of the manual.

15. Unsealed sources of licensed materials shall only be processed in the appropriate workplace as outlined below or in work areas giving equivalent protection as stated in the Permit.

16. Any fume hood which is used for the storage, separation, or manipulation of licensed material regardless of concentrations shall conform to the following restrictions. The hood must have an average face velocity of 150 linear feet per minute (ft min^{-1}) and a minimum face velocity of 125 ft min^{-1} at any point in the plane of the opening, the face velocity may vary no more than 20 percent. For Type II and III workplaces, the fume hood exhaust system shall have a high efficiency filtration system (HEPA) attached to it. In addition, when using volatile iodine in the fume hood an activated charcoal filter shall be added to the system. When the above specifications are met the fume hood will be considered an radiochemical fume hood and the air flow shall be checked yearly.

WORKPLACES FOR RADIONUCLIDES

Operations involving licensed material shall be designed, equipped, and conducted to provide the maximum practicable protection of personnel against the hazards of ionizing radiation.

A. REQUIREMENTS AND CLASSIFICATION

The requirements and classification of workplaces is based on the relative hazard of the manipulations and on the quantity and relative radiotoxicity of the radionuclides involved. The relative hazard of an operation is determined by an evaluation of the following factors:

1. The method by which the material may enter the body.

2. The solubility of the material.

3. The portion of the body that may be affected because of the chemical properties of the material.

4. The nature of the operation to be performed.

5. The quantity of material that will be used.

B. GUIDE FOR CLASSIFYING WORKPLACES

Use the following equation to obtain a guide to the type of workplace required:

$H = Q \times T \times U$ where H = Hazard Guide Value
Q = Quantity of Radionuclide (in microCi)
T = Relative Toxicity Factor
U = Use Factor

After the Hazard Guide Value is determined, the following table indicates the type of workplace required.

Hazard Guide Value, H	Workplace Required
0-100	Type I
100-1000	Type II
> 1000	Type III

Selection of the appropriate factors is as follows:

C. RELATIVE TOXICITY FACTOR

Relative Radiotoxicity	Relative Toxicity Factor (T)	Radionuclides					
Very High	100	^{90}Sr	^{90}Y	^{144}Nd	^{147}Sm	^{210}Pb	^{210}Po
		^{211}At	^{223}Ra	^{226}Ra	^{227}Ac	^{227}Th	^{228}Ra
		^{228}Th	^{230}Th	^{237}Np	^{238}Pu	^{239}Pu	^{240}Pu
		^{241}Am	^{241}Pu	^{242}Pu	^{242}Cm	^{243}Am	^{244}Cm
		^{252}Cf					
High	10	^{22}Na	^{40}K	^{45}Ca	^{46}Sc	^{60}Co	^{63}Ni
		^{85}Kr	^{99}Tc	^{106}Ru	^{106}Rh	^{125}I	^{126}I
		^{129}I	^{131}I	^{134}Cs	^{137}Cs	^{144}Ce	^{144}Pr
		^{154}Eu	^{170}Tm	^{181}Hf	^{182}Ta	^{203}Hg	^{210}Bi
		^{222}	^{224}	^{233}	^{234}		

			Rn		Ra		U		Th				
Moderate	1	24	Na	31	Si	32	P	33	P	35	S	36	Cl
		42	K	47	Sc	47	Ca	48	Sc	48	V	51	Cr
		52	Mn	54	Mn	55	Fe	56	Mn	57	Co	58	Co
		59	Ni	59	Fe	64	Cu	65	Zn	72	Ga	74	As
		75	Se	76	As	82	Br	85	Sr	86	Rb	89	Sr
		91	Y	95	Zr	95	Nb	96	Tc	98	Tc	99	Tc
		99m	Mo	103	Pd	103	Ru	103	Rh	105	Rh	105	Ag
		109	Ag	109	Cd	110m	Ag	111	Ag	113	Sn	113m	In
		115	Cd	123	I	127	Te	127m	Te	129	Te	132	I
		137	Ba	140	La	140	Ba	141	Ce	143	Pr	147	Pm
		151	Sm	166	Ho	177	Lu	181	W	183	Re	190	Ir
		191	Pt	192	Ir	193	Pt	196	Au	197	Hg	198	Au
		199	Au	200	Tl	201	Tl	202	Tl	203	Pb	204	Tl
		207	Bi	220	Rn	235	U		MFP				

Low	0.1	3	H	7	Be	14	C	18	F	59	Ni	69	Zn
		71	Ge	133	Ba	201	Ti	Nat	Th	238	U	Nat	U

D. USE FACTOR

Type of operation	Use Factor, U
Storage	0.01
Very simple, wet Diluting stock solutions Washing precipitates	0.1
Normal No production of dry material No vigorous chemical reactions Precipitation Filtration or centrifuging Solvent extraction Chromatography Pipetting or titrating	1
Simple, dry Fusion reactions Fluorination Transfer of dry precipitates Complex, wet Distillation Sampling and transfer Evaporation to dryness	10
Dry and dusty Machine or hand crushing Machining or sawing Sieving Mixing	100

E. EXAMPLES

(a) It is desired to store 14 microCi of Sr^{90}

From the factor tables:

Quantity, Q	= 14
Toxicity, T	= 100
Use Factor, U	= 0.01

Then H = Q x T x U

= 14 x 100 x 0.01 = 14

This value indicates a Type I workplace.

(b) 1.4 grams of natural uranium will be dry mixed into pigment.

1.4 gm U-nat = 0.95 microCi

T = 10

U = 100

Then H = Q x T x U

= 0.95 x 10 x 100 = 950

This value indicates a Type II workplace.

(c) A solution containing 1 milliCi of U^{233} will be filtered.

T = 100

U = 1

Then H = QTU

= 1000 x 100 x 1 = 100,000

This value indicates a Type III workplace.

F. CLASSIFICATION OF WORKPLACES

The classification of workplaces below serves to select areas and equipment suitable for safe operations with the licensed material to be used.

1. Type 1 workplaces are used only for low-hazard operations. The minimum requirements for such workplaces are:

   (a) The ventilation shall provide at least six air changes per hour.

   (b) The work surfaces shall be smooth and impermeable.

   (c) Personnel shall wear aprons or laboratory coats.

   (d) Sources of radiation shall be stored in metal cabinets.

   (e) A periodic monitoring program shall be maintained to detect any contamination surfaces.

   (f) Personnel shall be surveyed for any contamination in the event of an accident.

   (g) If a fume hood is used it must meet the specifications of a radiochemical fume hood.

2. Type II workplaces are used for operations of moderate or low hazard. The minimum requirements for such workplaces are:

   (a) Operations shall be carried out in a radiochemical fume hood.

   (b) The walls shall be smooth and the floors shall be protected with impermeable coverings.

   (c) The coverings of work surfaces shall be smooth, impermeable, and adapted to the type of operation.

   (d) Personnel shall wear laboratory coats and waterproof gloves.

   (e) Sources of radiation shall be stored in a hood or in a glove box.

   (f) A periodic monitoring program shall be maintained to detect external radiation and surface contamination.

   (g) A continuous monitoring program shall be maintained to detect atmospheric contamination.

(h) Contamination of hands shall be checked at appropriate times during operations.

(i) Contamination of clothing shall be checked daily at the termination of operations and after accidents.

(j) Special receptacles shall be provided for separate collection of solid and liquid residues generated in the workplace.

3. Type III workplaces are used for operations classed as high hazard. These workplaces must be isolated from other working areas. The minimum requirements for such workplaces are:

(a) Operations shall be carried out in glove boxes equipped with negative-pressure ventilation and high-efficiency filters. Other protective devices shall be included commensurate with the degree of hazard associated with the operations; namely, shielding, remote handling devices, air locks, bag-out ports, etc.

(b) The walls, ceilings, and floors shall be provided with impermeable coverings.

(c) The coverings of work surfaces shall be smooth, impermeable and adapted to the type of operation.

(d) The atmosphere in work rooms shall be maintained at negative pressure with respect to other parts of the building.

(e) Room exhaust shall be filtered through high-efficiency filters.

(f) Access to the workplace shall be limited to those persons actually needed to perform the operation.

(g) Personnel shall wear waterproof gloves when working in a gloved box.

(h) Sources of radiation shall be stored in gloved boxes, source pits, water pools or other devices commensurate with the degree of hazard and the nature of the material.

(i) A continuous monitoring program shall be maintained to detect atmospheric contamination, external radiation and surface contamination.

(j) Hands and clothing shall be checked for contamination at appropriate stages during operations.

(k) Special receptacles shall be provided for separate collection of solid and liquid residues generated during operations.

(1) Respiratory protection equipment and head coverings shall be immediately available to personnel in case of emergency, but shall not be relied on for ordinary operations.

APPENDIX B. SAMPLE OF RADIATION USE PERMITS AND APPLICATIONS

(See Following Pages)

Downloadable Files in .PDF and .DOC formats are available from the Radiation Safety Committtee QuickPlace intranet site https://quickplacepubwr.wr.usgs.gov/mprsc

U.S. Department of the Interior
U.S. Geological Survey, Western Region
345 Middlefield Road
Menlo Park, California 94025

RADIATION SAFETY COMMITTEE

APPLICATION FOR RADIATION USE PERMIT---Page 1

1. Applicant (Principal User):

2. Science Center/Project:

3. Telephone no. and street address where licensed material will be used. (include building no. and room no.:

4. Users:

_____
Principal User

5. Previous License numbers (or Permit nos.):

6. Individual responsible for radiation safety:

7. Licensed material (by isotope):

7(a). Maximum amount:

8. Form:

9. Describe in detail proposed use of licensed materials:

APPLICATION FOR RADIATION USE PERMIT---Page 2

10. Describe radiation safety program including type and frequency of monitoring (use separate sheet if necessary):

---

11. Training and experience of each individual User. Use separate sheet and indicate: type of training, where trained, duration, on the job or formal course covering specific training in the following subject areas.

    A. Principals and practices of radiation protection.

    B. Radioactivity measurement, standardization and monitoring techniques, and instruments.

    C. Mathematics and calculations basic to the use and measurement of radioactivity.

    D. Biological effects of radiation.

---

12. Experience with radiation (use separate sheet if necessary):

---

13. Radiation detection instruments available (use separate sheet if necessary):

14. Method, frequency, and standards used in calibrating radiation detection instruments:

APPLICATION FOR RADIATION USE PERMIT---Page 3

15. Proposed personnel dosimetry procedures:

---

16. Description of laboratory facilities and equipment (use separate sheet if necessary):

---

17. Proposed procedure for radioactive waste disposal:

The applicant (Principal User named in item 1), hereby certifies that this application is prepared in conformity with the procedures of the U.S. Geological Survey, and Title 10, Chapter 1, of the Code of Federal Regulations, Part 30. and that all information contained herein, including any supplements attached hereto, is true and correct to the best of his knowledge and belief.

_____

Signature Title

_____

Date

Application should be sent to the RSO, Menlo Park, CA Radiation Safety Committee.

UNITED STATES
DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY
WESTERN REGION
345 Middlefield Road, Menlo Park, California 94025

RENEWAL APPLICATION FOR RADIATION USE PERMIT
FOR JANUARY 1, 20____ TO DECEMBER 31, 20____
USNRC License No. 04-06674-07

Permit No._____ Principal User _____

Return to Secretary, Radiation Safety Committee, Menlo Park, CA

1. Where Radioactive Materials are to be used

   Telephone no.:

   Address:

   Building no.:

   Room designation:

2. Change in Science Center/Project (title/designation)

   None _____

   New one:

3. List Users

   1.

   2.

   3.

4. Individual responsible for radiation safety

Renewal Application for Radiation Use Permit----Page 2

5. Changes in licensed material(s) to be used

Isotope	Maximum Amount	Form

None _____

Delete:

Add:

6. Indicate additional training since last application

7. Changes in radiation detection instruments available

   a. None _____

   b. Delete: Add:

8. Changes in laboratory facilities, equipment or use of radioactive material

9. Supplemental information

Renewal Application for Radiation Use Permit----Page 3

10. Brief description of all current and proposed research activity with licensed materials for the upcoming year. If no changes from last year, okay to ***attach*** a copy of last years description.

The applicant (Principal User named in item 1), hereby certifies that this application is prepared in conformity with the procedures of the U.S. Geological Survey, and Title 10, Chapter 1, of the Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of his/her knowledge and belief.

_____

Signature Title

_____

Date

Current Radioactive Isotope Inventory----Page 4
Include Sealed Sources

Renewal Application for Radiation Use Permit----------Page 5

******For Radiation Safety Committee Use**********

1. Yes _____No _____ Radioactivity inventory included.

2. Yes _____No _____ Copies of all leak tests and calibration tests on file with RSC.

3. Yes _____No _____ File complete (leak tests, instrument calibration, waste disposal).

4. Yes _____No _____ Response to inspection required prior to issuing of Use Permit.

5. Yes _____No _____ Personnel have been informed of annual radiation exposure as noted by dosimetry records.

6. Yes _____No _____ Radiation Safety training up to date for all personnel.

7. Yes _____No _____ Recommend Permit be issued.

_____

Radiation Safety Officer

UNITED STATES
DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY
345 MIDDLEFIELD ROAD, MENLO PARK, CALIFORNIA 94025

RADIATION USE PERMIT

USNRC License No. _____

Permit No._____ Expiration Date _____

User(s) Science Center/Project Telephone: Work/home

_____
(Principal User)

_____

_____

_____

Licensed Materials Maximum Possession Limit Chemical and Physical Form

---

Conditions of Use

1. Users listed above will comply with regulations and statements contained in Title 10, Chapter 1, Code of Federal Regulations, Part 19, 20, 30, and 71 and the document entitled "Radiation Safety Manual: Licensed Material."

Radiation Use Permit No. _____

Expiration Date _____

2. Use of the licensed materials described above shall be by the User(s) under his immediate supervision.

3. Except as specifically provided otherwise by this Permit, the User(s) shall possess and use the licensed material described above in accordance with statements, representations, and procedures contained in the application.

4. User will have on file an approved written ALARA procedure which will be followed in the use of sealed sources and licensed materials. (If applicable)

5. A renewal application must be submitted to the Chairperson, Menlo Park, CA RSC on or before November 1st.

6. Users of unsealed sources of licensed material shall make routine surveys including area monitoring and wipe tests in all restricted areas under the Users control. The surveys shall be made at least monthly unless no use has occurred. For areas where licensed materials are stored, the minimum surveillance frequency is quarterly.

_____	_____
Principal User	Chairperson, Radiation Safety Committee
_____	_____
Date	Radiation Safety Officer

APPENDIX C. PERSONNEL – USERS, HANDLERS, AND NON-USERS

A. Procedures for personnel entering the Radiation Safety Program

1. Personnel wishing to enter the RSP must fill out three forms in this appendix and submit them to the RSO.

    a. Form 1: Statement of Radiation Training and Experience
    b. Form 2: Occupational Radiation Exposure Records
    c. Form 3: Dosimeter Form

2. The Principal User shall designate the radiation work category (See Section B, below).

3. Before beginning work, new personnel working with licensed material shall receive radiation safety training. New Users and Handlers must receive four (4) hours of training before beginning work with licensed materials. At least two (2) hours of this training must be spent reviewing the Radiation Safety Manual and individual Permit record keeping responsibilities and procedures. Additional training arrangements can be found in Part I, Section F, 3.0 of this manual.

4. Initial training must be documented in a memo to the RSO that states the training activities, the number of hours spent at each activity, and the dates of the training.

B. Definitions for radiation safety program personnel

1. Principal User: An individual specifically named in a Permit who has the responsibility and authority for the safe receipt, use, and disposal of licensed materials under that specific Permit. The Principal User is the person to which the Permit is issued. The Principal User is responsible for knowing all aspects of the Radiation Safety Manual and Radiation Safety Program. The responsibilities of the Principal Users are outlined in Part II, Section A, 3.0 of this manual. Licensed material Principal Users shall be knowledgeable of this entire manual.

2. User: An individual who has the responsibility and authority to safely receive, use, and dispose of licensed materials under a specific Permit. Users are able to perform all of the responsibilities of the Principal User if delegated. Only those employees with prior training in general radiation safety and experience in the intended uses of licensed materials will be designated as Users. Responsibilities of Users are further outlined in Part II, Section A, 3.0 of this manual. Licensed material Users shall be knowledgeable of this entire manual.

3. Handler: An individual who has received the required training in radiation safety, and has responsibility for the use of licensed material under the supervision of a User and a specific Permit. Licensed material Handlers shall be knowledgeable of pages 1-6, 11-13 and 14-25 of this manual at a minimum.

4. Non-User: An individual who works in restricted areas, but does not have the responsibility or authority to work with licensed material. Non-Users are not required to take radiation safety training, however, Non-Users that regularly work in restricted areas are encouraged to attend training classes. A*ll personnel* who have access to restricted areas, if even on a casual basis, are classified as Non-Users. This includes, but is not limited to other project personnel, administrative colleagues, janitors, salespersons, safety personnel, guards, and maintenance personnel. For Non-Users that do not enter restricted areas regularly, but occasionally require access, the RSC requires that they be informed of the licensed material activities taking place.

FORM #1

USGS
STATEMENT OF RADIATION TRAINING AND EXPERIENCE

Name: User Code (circle one): Principal User User Handler Non-User

Permit#: Ext: E-mail:

TRAINING

High school graduate: Yes No
College or University: Name(s) and location(s):

Years completed: Degree(s):
Course of study:

Education specifically applicable to the use of radioactive material (e.g. radiation safety classes at University):

EXPERIENCE

a. List experience with radioactivity beginning with most recent:

(1) Dates: From: To:
(2) Title and duties:
(3) Employer:
(4) Address:

(1) Dates: From: To:
(2) Title and duties:
(3) Employer:
(4) Address:

(1) Dates: From: To:
(2) Title and duties:
(3) Employer:
(4) Address:

PAGE 2

b. Radioactive material previously used. Cite typical radioisotopes and amounts per experiment.

c. Briefly describe procedures using radioisotopes for each type of isotope (example: ^{32}P labeling, ^{125}I iodination).

d. If you have any other information which will help you to evaluate user level with radioisotopes, please provide it in the space below. You should refer to the Radiation Safety Manual (Appendix C) for information on user levels.

SIGNATURES:

Employee: Date:

Principal User: Date:

Form #2

USGS
OCCUPATIONAL RADIATION EXPOSURE RECORDS

We must obtain a copy of your radiation records from your most recent employer to ensure that your life time exposure levels are kept current. This information is required by NRC and the California Department of Radiological Health Services.

PLEASE PROVIDE THE FOLLOWING INFORMATION.

Name:

Social Security Number:

Have you ever worn a dosimetry badge? Yes No
Have you ever worn a dosimetry ring? Yes No

PREVIOUS EMPLOYER:

Name:

Address:

Month/Year you worked at the above listed address:

Start Date: End Date:

Form #3

USGS
DOSIMETER FORM

Name:

SSN:

Date of Birth:

Principal User's Name:

Permit Number:

APPENDIX D. - DEFINITIONS

As used in this manual, the following definitions will apply.

Airborne radioactive area - Any room, enclosure, or operating area accessible to individuals in which airborne radioactive material exists in concentrations in excess of those specified in Appendix B, Title 10, Part 20, of the Code of Federal Regulations.

Airborne radioactive material - Any radioactive material dispersed into the air in the form of dust, fumes, mist, vapor, or gases above normal background levels.

ALARA - As low as reasonably achievable.

ADL - Annual radiation dose limit.

Alternate - A designated alternate to the Radiation Safety Committee.

CFR - The U.S. Code of Federal Regulations http://www.nrc.gov/reading-rm/doc-collections/

Chairperson - See Menlo Park, CA Radiation Safety Committee Chairperson in this appendix.

RSC - See Menlo Park, CA Radiation Committee in this appendix.

Contamination - Radioactive material present on surfaces, in air, or liquids, in such a form that it could become ingested, spread to an uncontrolled area, interfere with the operation of sensitive instrumentation, or cause individuals to be exposed to unnecessary levels of radiation.

Controlled areas - Any area, access to which, is controlled by the licensee or User for purposes of protection of individuals from exposure to radiation and licensed materials.

dpm- Acronym for "disintegrations per minute" - a measure of the radioactivity in terms of number of radioactive atoms undergoing transmutation by alpha, beta, gamma, or other modes of radioactive decay expressed in terms of atoms per minute. Note: This is not the same as "counts per minute" - (cpm) which is a measure of the counting rate of an instrument.

Dose - The quantity of radiation absorbed per unit mass by the body or any portion of the body. --(units - RAD or REM).

Environment - That area beyond control of the User, i.e., uncontrolled areas.

Fixed surface contamination - Radioactive contamination which is fixed to a surface and would not be normally removed by activities normal to the use of the object.

Generally licensed devices - Quantities of radioactive material of small amount considered to be available for possession without a specific License issued by the U.S. Nuclear Regulatory Commission. For additional information, see Title 10, Chapter 1, Parts 30, 31, 40, and 70 of the Code of Federal Regulations.

Handlers - An individual who has received the required training in radiation safety, and has responsibility for the safe use of licensed material.

Hazard guide - (see Appendix A) A guide to the relative degree of hazard for a particular manipulation of radioactive materials when the toxicity, use and form of radioactive material are considered.

High radiation area - Any area accessible to individuals in which there exists radiation at such levels that an individual could receive in 1 hour a whole-body dose in excess of 100 mrem.

Individual - Any human being.

Ionizing radiation - See "Radiation".

License – see Radioactive Materials License

Licensee - Holder of a License.

Licensed material - Source material, special nuclear material, byproduct material, or technologically enhanced Radioactive Material possessed, used or transferred under a specific License issued to the USGS, MP by the U.S. Nuclear Regulatory Commission pursuant to Title 10, Chapter 1 of the Code of Federal Regulations.

Limited quantities -

NCRP - The National Committee on Radiation Protection, an advisory committee composed of experts in the radiation protection field who provide basic recommendations on radiation protection standards, measurements and other relevant matters.

Non-User - An individual who works in restricted areas, but does not have the responsibility or authority to work with licensed material.

Occupational dose - Includes exposure of individual to radiation in (1) a restricted area, or (2) in the course of employment in which the individual's duties involve exposure to radiation provided that "occupational dose" shall not be deemed to include any

exposure of an individual to radiation for the purpose of medical diagnosis or medical therapy of such individual.

Permit - A signed and valid authorization to use licensed materials within the USGS, MP, as issued by the RSC, according to the guidelines and regulations of this manual, the USNRC, and the U.S. Geological Survey broad type A licensed materials License.

Principal User - An individual specifically named in a Permit who has the responsibility and authority for the safe receipt, use, and disposal of radioactive licensed materials under that specific Permit.

Project - A specifically funded group or subgroup within the USGS, MP having specific responsibility and authority over an activity as used in this Manual. A specific project with delegated authority and responsibility for using radioactive licensed material under a Permit.

QuickPlace – RSC documents, inventory, training, forms and related items available on the USGS Intranet. https://quickplacepubwr.wr.usgs.gov/mprsc to RSC personnel.

Radiation - Any or all of the following: alpha rays, beta rays, gamma rays, x-rays, neutrons, high speed electrons, high speed photons, and other atomic particles, but not sound or radio waves or visible infrared or ultraviolet light.

Radiation area - Any area accessible to individuals, wherein there exists radiation levels such that an individual could receive, in any 1 hour, exposure to the whole body in excess of 5 millirem or in any five consecutive days a dose in excess of 100 millirem.

Radiation protection survey - An inspection of existing radiological safety conditions which may vary depending on the type of radioactive material or radiation use in existence. Such surveys may include wipe tests for radioactive contamination, area surveys to determine existing radiation levels, and other specific tests and procedures to delineate potential radiation hazards and radioactive contamination levels.

Radiation Safety Officer - The individual specifically trained as a "qualified expert" in radiation protection. This person serves as a member of the Radiation Safety Committee and is responsible for the day-to-day implementation of the Radiation Safety Program.

Radiation survey - See radiation protection survey.

Radiation use Permit - See Permit.

Radiation workers – Personnel regularly assigned to Restricted Areas.

Radioactive material - Includes any material which spontaneously emits radiation whether or not subject to licensing control by the USNRC.

Radioactive Materials License (RAML) - A License authorizing possession and use of radioactive materials issued under the regulations of Title 10, Chapter 1, Parts 30 to 33, 40, or 70 of the Code of Federal Regulations or the equivalent issued by an agreement state.

Radiochemical fume hood - A fume hood or enclosure designed for the safe use of certain quantities of radioactive materials. The radioactive fume hood should have smooth surfaces for ease of decontamination and may have a stack monitoring system. It shall have a linear air face velocity in excess of 125 feet per minute.

Radiological emergency - An incident or emergency involving radiation or radioactive materials which is unanticipated and may provide risk of injury or damage to property or persons.

Relative toxicity factor - A factor taking into account the biological damage which may be encountered by the release of certain radionuclides, see Appendix A for table.

Rem - The measure of dose of any ionizing radiation to body tissues in terms of its estimated biological effect relative to a dose of one rad of x-rays (1 millirem - 1/1000 of a rem). The rem dose is normally equal to the rad dose times a "relative biological effect" taking into account the fact that some types of radiation are more damaging than others. For additional information, see CFR, Title 10, Section 20.4c.

Removable surface contamination - Radioactive contamination of objects which can be removed by simple normal processes, such as rubbing, washing or other simple nondestructive techniques.

Restricted area - Any area, access to which, is controlled by the licensee or User for purposes of protection of individuals from exposure to radiation and licensed materials. "Restricted area" shall not include any areas used as residential quarters.

Sealed source – Any byproduct material that is encased in a capsule designed to prevent leakage or escape of the byproduct material.

Secretary - See Menlo Park, CA Radiation Safety Committee Secretary in this appendix.

Source material - Uranium or thorium (excludes special nuclear material)

Special nuclear material - Plutonium, uranium 233, or uranium enriched in the isotope 233 or the isotope 235.

Transport or transported - The carrying of licensed materials by hand, cart, vehicle or by other means from one location to another.

Unrestricted area - Any area, access to which, is not controlled by the licensee (User) for purposes of protection of individuals from exposure to radiation and licensed materials and any area used for residential quarters.

User - (see I-C) An individual who has the responsibility and authority to receive, safely use, and dispose of licensed materials under a specific Permit.

USDOT – The United States Department of Transportation.

USGS, MP - The Western Region of the United States Department of the Interior, Geological Survey headquartered in Menlo Park, California.

USNRC - The United States Nuclear Regulatory Commission.

Menlo Park, CA Radiation Safety Committee - (short form - the RSC) - The Radiation Safety Committee, whose membership is responsible for the review, approval, and issuance of the Radiation Safety Program, Radiation Use Permits, and similar activities within the USGS, MP, headquartered in Menlo Park, California.

Menlo Park, CA Radiation Safety Committee Chairperson - (short form - Chairperson) - the Chairperson or acting Chairperson of the RSC.

Menlo Park, CA Radiation Safety Committee Secretary - (short form - Secretary) - the Secretary, or acting Secretary of the RSC.

Wipe test - A test for radioactive contamination which typically consists of rubbing a small piece of absorbent material over an area suspected of radioactive contamination followed by a subsequent assay of the absorbent material for removable radioactivity.

Workplace - A specific area where licensed materials are to be used - specific areas designated as radioactive workplaces shall be as outlined in Appendix A of this manual.

APPENDIX E: MANAGEMENT OF WELL-LOGGING SOURCES

A. Management records

1. Utilization log

This log will contain the master file on each type of shipment of licensed materials received and distribution of each such shipment. This master file will be maintained at the facility. Some of the records contained in this file are:

a. Copy of the purchase order listing the type and strength of the materials.

b. Packing slip and receipt of delivery.

c. Log sheets of what time the materials are removed and returned to the permanent storage as well as the location where the source was used.

d. Leak test reports.

e. Emergency procedure reports.

f. Records of disposal.

g. Receipt for shipment when the source is disposed of.

2. Survey file

a. A Survey File will be maintained and contain the following:

(1)Instrument calibration reports and certificate.

(2)Monthly survey of the storage building and vehicles.

(3)Radioactive Monitoring Form No. 100 for each job.

3. Personnel monitoring procedures and file

a. All personnel directly related to the activity involving licensed materials will wear a film badge to monitor gamma, neutron and beta exposure.

b. Film badge will be processed quarterly.

c. All personnel directly related to the activity involving licensed material, that yet may come into contact with an exposure level of 2 mr/hr or greater, will be required to wear a dosimeter or film badge and a record of the exposure will be logged.

d. Also filed for each employee will be previous exposure levels from past employers.

B. Radiation protection - Instruments and calibration

1. Survey instruments will be used each time a source is handled or transported.

2. Survey instruments are low range beta-gamma and will be calibrated every twelve (12) months.

3. Neutron counts will be detected by an approved neutron detector, (Eberline PNR-4 or equivalent), calibrated every twelve (12) months.

4. Records of the calibrations will be maintained in the survey file and copies of the records will be carried with the instruments.

C. Leak tests

1. All sealed sources will be leak tested at an interval not to exceed six (6) months.

2. The wipe will be evaluated by the RSO and the record of the test will be maintained in the utilization log.

3. A source is not to be used without proof that it has been leak tested within the last six (6) months.

4. A copy of the leak test report will be kept on file at all times.

D. Monthly survey of the storage building and vehicles

1. Surveys of the storage area will be maintained on a annual basis and filed in the survey file. These surveys will reflect in milliroentgens, readings at a point on each side of the storage area.

2. Vehicle surveys will be conducted at monthly intervals. These surveys will be maintained in the survey file, and a copy will be attached to the job sheet.

E. Storage facilities and procedures

1. Storing and securing

a. Upon receipt of the licensed materials, the receiving record will be placed in the utilization log. The materials will be placed in the approved storage area. This storage area will be locked. Materials, when not in use, will remain in the storage area properly locked and secured.

b. Storage facilities are designed and positioned so that no person in an uncontrolled area will receive more than 2 mrems in any hour or more than 100 mrems in any seven (7) consecutive days.

APPENDIX F: PROCEDURES FOR THE USE OF WELL-LOGGING SOURCES

A. General - normal operations

1. USGS, MP personnel directly in charge of logging operations utilizing radioactive sources are responsible for the health protection of all personnel associated with the source and the general public who may also be associated with this radioactive source at times. The above personnel must supervise all source handling operations, transportation, storage and shipping according to the following regulations.

a. USGS, MP personnel who have been trained in handling sealed sources shall be the only ones who perform or directly supervise operations involving the source. All other personnel shall be required to be remote from the area or wear a dosimeter.

b. Only the approved handling tools will be used.

c. All sources are to be transported in the approved and locked source shipping containers, which is locked to an integral part of the truck.

d. Using the remote handling tool the source is removed from the transport container. The source is attached to the logging tool and placed inside of the well. When logging operations are finished the operator will remove the tool from the well. Utilizing the remote handling tool, the source will be removed and placed back into the storage container.

2. Procedure for transporting and recording

a. Remove storage container from storage area. With a low-level survey meter record the level of radiation six (6) inches from the container and record on Form No. 100.

b. Place source in the vehicle in the secured position. Monitor the vehicle and record on Form 100. Be sure the source is locked down. An identification will be on each container transported, and the vehicle will be placarded with the USDOT markings.

c. At arrival at the well site, monitor the area before starting job. Record on Form No. 100. After the job is finished remonitor the area to show there is no ground contamination and record on Form No. 100. Also monitor the truck and handling tools and record.

d. After returning the sources to the storage building, monitor the vehicle to show it is free of any contamination and record on Form No. 100.

B. Emergency operations

1. **Vehicle wreck**

   In the event of an accident while transporting licensed materials, the following procedure should be followed:

   a. Do not leave the area unattended by qualified personnel.

   b. Notify the investigating officer.

   c. Notify the Radiation Safety Officer or designee.

   d. Survey the area and close off any area where the level is above 2 mr/hr.

   e. Decontaminate the contaminated area (if any).

   f. The Radiation Safety Officer will notify the proper governmental agency in accordance with Section 20.403 of 10 CFR 20.

2. **Procedure for a lost source downhole**

   a. When a source is lost, notify the well owner that a source is stuck in the well. As soon as possible hand him/her a drawing of the source and housing model.

   b. Notify the Radiation Safety Officer and he/she will notify the proper agency involved that a source has been lost and keep them informed of the progress toward recovering the source.

   c. Dosimeters will be furnished to all rig personnel and company personnel.

   d. During the critical fishing operations the mud being circulated should be monitored using a gamma ray tool (downhole tool) in the mud.

   e. Where practical, everyone except the driller and enough personnel to cover the hole should remain in the area. All handling of the rig equipment should be handled by the customer themselves, the actual handling of the retrieved source is to be done by the Principal User.

   f. The procedure for a lost source is in Appendix G.

3. **Fire and other emergencies**

   a. Notify all personnel in the area immediately.

   b. Attempt to put out all fires if a radiation hazard is not immediately present.

c. Notify the fire department.

d. Notify the Principal User.

e. The Principal User will set up restrictions governing the fire fighting and other emergency activities.

f. Following the emergency, monitor the area and ascertain the emergency devices necessary for safe decontamination.

g. Decontaminate.

h. The Radiation Safety Officer will have to approve the area before work can resume.

i. Monitor all persons involved in combating the emergency.

j. Prepare a complete history of the accident and report to the Radiation Safety Officer who will in turn report it to the Radiation Safety Committee and the proper agency(ies).

4. Leaking source

a. If a source is leaking, which the logging tool would indicate, shut the operation down.

b. Immediately notify Radiation Safety Officer or designee for instructions.

c. Set up control procedures for keeping personnel out of the immediate area until instructions are received from the Radiation Safety Officer.

APPENDIX G: LOST SOURCE DOWNHOLE PROCEDURES

A. Factors influencing the decision on recovery of a source when stuck in a well.

1. Cost of the tool versus best estimate of minimum cost and probable maximum cost of recovery.

2. The risk of sticking a drill stem and fishing tools, especially if all zones of interest are above the tool.

3. Interference of the tool with potential production and deeper drilling.

4. Value of clearing the hole for additional logs.

B. When a radioactive source is associated with stuck equipment, the USGS becomes more actively involved. Our responsibilities are:

1. Remain in contact with the owner and contractor and offer our best advice and recommendations regarding safe fishing procedures.

2. Take care to recognize the possibility that a fishing procedure might damage a source capsule.

3. Notify the USNRC and State Radiologic Health Officials if it becomes apparent that it is desirable or advisable to abandon the source in the well.

C. The introduction of the regulatory agencies does not alter the main objectives: to recover the source intact or abandon it in such a way as to protect personnel and property in the future.

1. If abandonment of a source appears imminent, the Radiation Safety Officer notifies the USNRC and State by telephone. We then attempt to determine which line of action is to the best interest of all concerned, what the owner wishes and can reasonably do, and to present a packaged proposal to the agencies for final approval or further recommendations.

2. Abandonment of a source in a dry hole is simple. All records, including those of the State agency issuing permits for or controlling the drilling of wells, should contain information regarding the depth, date, type and quantity of licensed materials. The wellhead, if left above the surface, should contain the same information on an engraved durable metal placard.

3. A source left below a producing zone presents little difficulty. In most cases the normal cementing of the production string of casing or tubing will isolate the source. If the well is to be produced from open hole completion, cement

should be spotted around and/or above it to prevent the movement of fluids past the capsule and eventual destruction of the capsule through abrasion.

4. In questionable cases the life of the capsule and the solubility of licensed materials might influence the acceptance of the proposal. (The source capsules have an estimated life of 500 years in the undisturbed salt water. The solubility of the licensed materials is in the order of one part per billion per week.)

5. Production of gas, water or oil past a source should be prohibited unless the capsule is protected from abrasion. Casing or tubing should be adequate. The spotting of cement, if practical and feasible, adds to the protection. Care should be taken in setting casing past the location of the tool to avoid dislodging it. A gamma ray survey run after the casing is below the zone will give assurance that the tool and source will not be encountered and damaged at a lower level.

6. In the event a source is left in a producing zone it should be cemented in place if possible. Extreme caution should be used in side tracking to avoid reentering the original hole and damaging the source container. Normally, the source is at or near the bottom of the tool. If there were sufficient clearance to place cement around the source the tool would, in most cases, be retrievable. However, the drilling mud would probably harden in a short time to prevent appreciable flow of fluids by the source. In addition, the separation between the new and original hole would reduce the rate of flow at the tool to a very small figure. It is recommended that the new and old holes be separated by at least 15 feet to preclude any possibility of damage to the source by perforating.

7. A gamma ray source abandoned in a well cannot "induce" radioactivity in gas, oil, water, or other materials. For all practical purposes the same may be said of 3 curie, 5 curie and 20 curie AmBe neutron sources. Although neutron flux at one foot from a 3 curie, 5 curie, or 20 curie source is negligible in this respect. For example, the flux in a reactor used to activate a cobalt-60 "Pip" tag to 10 microcuries is hundreds of millions of times greater than that at one foot from a 5 curie source. Although it is not precisely correct to say that there is no activation, induced radioactivity would be almost immeasurable initially, and through decay would be totally obscured by natural background radiation long before the material reached the surface.

D. Summary

1. All precautions should be taken to avoid rupture of a radioactive source during fishing operation. Although each source has been individually pressure tested to 25,000 psi, it is small and will not withstand milling, drilling, or pounding fishing operations.

2. A radioactive source which is intact may be safely abandoned in the well. The decision as to whether to abandon a tool with a source would be based on the accepted considerations for abandoning any other type tool. Added guidelines are the safety aspect, the proper placarding of the well and entering the information in the well records.

3. Responsibility for notifying the regulatory agencies and making all reports is that of the Radiation Safety Officer.

APPENDIX H: USGS, MP PROCEDURES FOR ORDERING, RECEIVING, AND TRANSFERRING LICENSED MATERIALS TO ANOTHER LICENSE

A. Ordering licensed material using project-level credit cards (See next page for template)

United States Department of the Interior
Geological Survey
Menlo Park
Radiation Safety Committee
345 Middlefield Road
Menlo Park, CA 94025

DATE

Vendor
Vendors Address
Vendors Phone Number
Vendors Contact or Sales Person

CREDIT CARD PURCHASE

Item No.	Licensed materials description	Quantity	Amount

The procurement, possession, use and disposal of this licensed materials is covered by
Permit #_____
and by USNRC License #_____

Approved by_____
Radiation Safety Officer, Menlo Park, CA Radiation Safety Committee

SHIP TO:
ATTENTION: User's Name
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
Phone (650) 329- **(Very Important** so Mail Room can notify you when shipment is received)

B. Receiving licensed material

1. When a package arrives in the mailroom that contains licensed material the following steps shall be performed. Always be prepared for a Radiological Emergency. Only Users with current "mailroom licensed material receiving" training (or DOT training) are authorized to transport licensed material from the mailroom to the laboratories. Mailroom licensed material training shall be updated every three years.

    a. Visually inspect package for damage, leakage or breach of security seals.

    b. Check shipping papers and package labeling for accuracy of material.

    c. If the package or paperwork (a or b above) are NOT in order, proceed to step C.4.

    d. If package and paperwork are in order transport package to the lab and perform a survey of the package in accordance with Section C of this appendix.

    e. Upon completion of the above steps, enter the identification and conditions of the material received and survey results into a licensed material log book (Section D, this Appendix; a Licensed Material Receival Record Form is provided at the end of Section D).

    f. A copy of all records of receipt and survey meter readings shall be sent to the Radiation Safety Officer.

C. Surveying licensed material

1. The following survey should be completed as soon as practicable after receipt of the package and not more than three hours after receipt during working hours and not later than three hours from the beginning of the next working day if it is received after working hours (10 CFR 20.1906).

2. When preparing to survey packages and containers containing licensed materials assume that the item to be surveyed may be contaminated and the dose rate may be a hazard. Always wear gloves when processing the packages.

    a. Appraise the size, quantities and physical state of the materials involved.

    b. Turn the survey instrument "on" several feet before approaching the container or package.

    c. Determine the dose rate without touching the container at one (1) meter and at contact. If the dose rate exceeds appropriate limits (Appendix H, Table 1, below) notify the RSO or designee immediately. See procedures 4 and 5 below.

TABLE 1

Dose Limits For Packages of Licensed Materials
(49 CFR 172.403 and 49 CFR 173.441)

Package Label	Maximum Dose Rate at Surface of Package	Maximum Dose Rate 1 Meter from Surface
Radioactive White I	0.5 mRem/hr	0.0 mRem/hr
Radioactive Yellow II	50 mRem/hr	1.0 mRem/hr
Radioactive Yellow III	200 mRem/hr	10.0 mRem/hr

d. Wipe test the outside shipping carton of the package for removable contamination. If removable contamination exceeds 22,000 dpm/300 cm^2 beta-gamma or 220/300 cm^2 alpha, notify the Radiation Safety Officer immediately; she/he in turn shall notify the delivery company and the USNRC Regional Office immediately (10 CFR 20.1906).

3. If levels of contamination are acceptable proceed with the following procedures.

a. Place package in a ventilated fume hood.

b. Open outer package and verify that the contents agree in name and activity with the packing slip.

c. Measure radiation field of unshielded container. If necessary, place container behind shielding and upon containment surface to reduce exposure to acceptable levels and proceed with remote handling devices.

d. Check for possible breakage of seals or containers, loss of liquid or change in a color of absorbing material.

e. Wipe test inner contents and document all findings in User's own log book.

f. Keep a record of all wipe test results in a log book and update current inventory records to reflect new licensed material.

g. If any discrepancies are discovered in the activity or chemical form received, update logbook in shipping to address these discrepancies.

h. All packing materials, and material used to do the surveys, should be considered radioactive waste and disposed of properly.

4. If the package or paperwork is NOT in order or you suspect radioactive contamination the User or Principal User should proceed as follows.

   a. Notification
      i. Isolate the package.
      ii. Ascertain if anybody has had contact with the package, contact them, and restrict their movement.
      iii. Determine if radioactivity is present on outside of package using survey meter and wipe tests.
      iv. If contamination is present, notify the RSO or designee immediately: she/he in turn shall notify the delivery company and the USNRC Regional Office immediately.
      v. Assess potential for ingestion of radioactive material and transdermal contamination of anybody in contact with package.
      vi. Restrict ingress and egress to the mailroom
      vii. The User, or someone designated by the User, must remain at the mailroom until relieved by someone designated either by the RSO or the User.

   b. Mitigation (See pp. 22-24 in Manual, Radiation Incidents and Emergencies)
      i. Wear protective clothing in contaminated area (lab coats, shoe covers, gloves).
      ii. Do not allow anyone to enter a contaminated area without protective clothing, including lab coats, shoe covers and gloves.
      iii. Permit no one to leave a contaminated area without appropriate monitoring and transferring to clean footwear and external clothing as demonstrated by radiation monitoring with appropriate calibrated instrument (normally a Geiger counter with audible output).
      iv. Ascertain the extent of the contamination. Include the physical areas as well as mailroom personnel in contact with package.
      v. Minimize the spread of radioactivity. Set up perimeter containment with barriers, absorbers or similar devices.
      vi. Proceed with appropriate decontamination procedures.

D. Licensed materials logbook.

1. The following items listed below need to be entered into a log book after each shipment of licensed material is received. A Licensed Material Receival Record Form is included with this section.

    1. Name and address of supplier

    2. Description of licensed material

    3. Condition of package/container

    4. Time and date of receival

    5. Dose Rate: at 1 meter _____mR/hr; _____ mR/hr Surface

    6. Wipe test results beta-gamma _____ dpm/300 cm^2; alpha _____ dpm/300 cm^2

    7. Authorized User _____

    8. Receiver's initials _____

    9. Permit number _____

LICENSED MATERIAL RECEIVAL RECORD

User's Name _____ Use Permit No. _____

Vendor's Name _____

Address _____

_____

I. Description

Isotopic Content _____ Activity (mCi)_____

Physical Form _____Chemical Form _____

II. Shipping Information

Method of Shipment _____Labels Applied to Package _____

Type of Container _____Total Transport Index _____

III. Health Physics Survey

Shipping Container (Maximum)

A. Maximum external radiation level

mrem/hr at outer surface _____

mrem/hr at 3 feet from outer surface _____

B. Contamination on outer surface

Alpha (dpm/300 cm^2) _____

Beta-Gamma (dpm/300 cm^2) _____

C. Other significant monitoring results: _____

_____ _____

Date_____ Surveyer (Signature) _____

E. Procedures for transfer of licensed material to another License.

1. Prior to transferring radioactive licensed material, the Principal User will obtain two copies of the License of the transferee. One copy will be forwarded to the Radiation Safety Officer. The second copy will be retained by the Principal User. The Principal User will also submit to the Radiation Safety Officer one copy of standard form "Radiation Material Transfer Record" and one notice of receival.

2. The Radiation Safety Officer will verify that the transfer complies with the conditions of the transferees License as to isotope form and activity.

3. If the transfer is permanent, no further action is required. If the transfer is temporary, records of all required wipe tests must be received by the Principal User and copies sent to the Radiation Safety Officer.

4. Upon completion, a memo signed by both parties shall confirm the transfer. This memo will be filed with the Principal User and a copy sent to the Radiation Safety Officer.

RADIOACTIVE MATERIAL TRANSFER RECORD

From: _____ To: _____

Radioactive Material License Number:
NRC _____

Radioactive Material License Number:
_____

I. Description

Isotopic Content _____ Activity (Curies) _____
Physical Form _____ Chemical Form _____

II. Shipping Information

Method of Shipment _____ Shipping Weight (lb) _____

Type of Container _____ D.O.T. Specification No. _____

Transport Group(s) _____ D.O.T. Special Permit No. _____

Labels Applied to Package _____

Total Transport Index _____

III. Health Physics Survey

Shipping Container
(Maximum)

A. Maximum external radiation level

mrem/hr at outer surface _____

mrem/hr at 3 feet from
outer surface _____

B. Contamination on outer surface

Alpha (dpm/300 cm^2) _____

Beta-Gamma (dpm/300 cm^2) _____

C. Other significant monitoring results: _____

_____

Date _____ Surveyer (Signature) _____

Monitoring results, packaging and labeling checked for compliance with applicable regulations.

This is to certify that the above-named articles are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Date _____ Signature _____

APPENDIX I: DECAY-IN-STORAGE PROGRAM FOR MATERIALS WITH HALF-LIVES LESS THAN 120 DAYS

We are authorized to hold radioactive licensed material with a physical half life of less than 120 days for decay-in-storage before disposal to ordinary trash. The License Condition shall read as follows.

A. Radioactive licensed waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives.
B. Before disposal as ordinary trash, byproduct material shall be surveyed at the container surface with the appropriate meter set on its most sensitive scale and with no interposed shielding to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.
C. A record of each disposal permitted under this License Condition shall be retained for 3 years. The record must include the date of disposal, the date on which the byproduct material was placed in storage, the radionuclides disposed, the survey instrument used, the background dose rate, the dose rate measured at the surface of each waste container, and the name of the individual who performed the disposal.

General Procudures.

1. Solid radioactive licensed waste with half-lives less than 120 days shall be separated from the main waste system by the generator and shielded, if necessary. A representative sample of contaminated material (such as a surface wipe or absorbed spill on paper) shall be attached to the outer surface of the container in a separate plastic bag. The date of entry into the waste system and an estimate of the activity shall be noted on the outer bag or container, along with identification of the isotope and an expected release date. A copy of the Storage-in-Decay Log Sheet provided in the Manual (Appendix I) shall accompany with the material. After storage for 10 half–lives, the representative material shall be surveyed by the most sensitive means possible (pancake style G-M meter for gamma and alpha [e.g. Micro R meter; See Permit #8), or direct counting of surface wipes for beta) to determine that its radioactivity cannot be distinguished from background. If no activity is detected, the

bulk material shall be disposed of after radiation labels are removed or obliterated from the containers. Record keeping for sanitary sewage disposal shall be the responsibility of the generator.

2. Liquid radioactive licensed wastes with half-lives shorter than 120 days shall be identified by the generator and stored separately in an appropriate restricted location with the help of the Radiation Safety Officer. Liquid wastes shall be marked with the isotope, activity, date of entry into the waste system, and the expected release date. The release date will be calculated by the generator from the activity and the half-life using the limits for sewage disposal identified in Title 10, CFR, Part 20, Appendix B. A copy of the Storage-in-Decay Log Sheet provided in the Manual shall accompany with the material. After the estimated release date, the liquid waste shall be counted by the most appropriate means to ensure that activity is below sewage release levels. The liquid waste shall then be removed from the waste processing shed and disposed of in the generator's designated sewage release area. Record keeping for sanitary sewage disposal shall be the responsibility of the generator.

3. Disposal records for solid and liquid radioactive licensed wastes with half-lives shorter than 120 days shall include the date of disposal, the date on which the byproduct material was placed in storage, the radionuclides disposed, the survey instruments used, the background dose rate, the dose rate measured at the surface of each waste container, and the name of the individual who performed the disposal. A record of each disposal permitted under the hold for decay program shall be retained for three years by the Permit.

STORAGE-IN-DECAY RECORD FOR MATERIALS WITH HALF-LIVES OF 120 DAYS OR LESS

User's Name _____ Use Permit No. _____

Date Placed in Storage _____

Calculated Date of Release/Disposal _____

I. Description.

Isotopic Content _____ Activity (mCi)_____

Physical Form _____Chemical Form _____

Half-Life _____

II. Solid Wastes.

		(Maximum)
A. External Radiation Level		
mrem/hr at outer surface	(At Storage)	(Release) _____
mrem/hr at 3 feet from outer surface	(At Storage)	(Release) _____
B. Contamination on Outer Surface		
Alpha (dpm/100 cm^2)	(At Storage)	(Release) _____
Beta-Gamma (dpm/100 cm^2)	(At Storage)	(Release) _____

C. Survey Instrument Used: _____

III. Liquid Wastes.

A. External Radiation Level

mrem/hr at outer surface	(At Storage)	(Release) _____
mrem/hr at 3 feet from outer surface	(At Storage)	(Release) _____

B. Contamination on Outer Surface

Alpha (dpm/100 cm^2)	(At Storage)	(Release) _____
Beta-Gamma (dpm/100 cm^2)	(At Storage)	(Release) _____

C. Survey Instrument Used _____

D. Specific Activity _____ Total μCi Total Volume_____

Date_____ Surveyer (Signature) _____

APPENDIX J: TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS; INSTRUCTION TO WORKERS

8.8 Item 8: Training for Individuals Working in or Frequenting Restricted Areas (Occupationally Exposed Individuals and Ancillary Personnel)

http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1556/v7/#_1_31

Criteria: Individuals whose assigned duties involve exposure to radiation and/or radioactive material (from both licensed and unlicensed sources), and in the course of their employment are likely to receive in a year an occupational dose of radiation greater than 1 mSv (100 mrem), must receive instruction commensurate with their duties and responsibilities, as required by 10 CFR 19.12.

Discussion: Before beginning work with licensed material, most individuals must receive radiation safety training commensurate with their assigned duties and specific to the licensee's radiation safety program. Each individual should also receive periodic refresher training.

Licensees should not assume that safety instruction has been adequately covered by prior employment or academic training. Site-specific training should be provided for all individuals. Particular attention should be given to persons performing work with radioactive materials that may require special procedures, such as hot cell work, waste processing, and animal handling. Also, ancillary personnel (e.g., clerical, housekeeping, security) whose duties may require them to work in the vicinity of radioactive material (whether escorted or not) need to be informed about radiation hazards and the appropriate precautions. The licensee should assess each individual's involvement with licensed material and cover each applicable subject appropriately.

Training may be in the form of lecture, demonstrations, videotape, or self-study, and should emphasize practical subjects important to the safe use of licensed material. The guidance in this appendix may be used to develop a training program. The program should consider both the topics pertinent for each group of workers and the method and frequency of training.

The person conducting the training should be a qualified individual (e.g., a person who meets the qualifications for RSO or authorized user on the license and is familiar with the licensee's program).

Response from Applicant: A description of the radiation safety training program, including topics covered, groups of workers, assessment of training, qualifications of instructors, and the method and frequency of training.

§ 10CFR Part 19.12 Instruction to workers.

http://www.nrc.gov/reading-rm/doc-collections/cfr/part019/part019-0012.html

(a) All individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem (1 mSv) shall be--

(1) Kept informed of the storage, transfer, or use of radiation and/or radioactive material;

(2) Instructed in the health protection problems associated with exposure to radiation and/or radioactive material, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed;

(3) Instructed in, and required to observe, to the extent within the workers control, the applicable provisions of Commission regulations and licenses for the protection of personnel from exposure to radiation and/or radioactive material;

(4) Instructed of their responsibility to report promptly to the licensee any condition which may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation and/or radioactive material;

(5) Instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation and/or radioactive material; and

(6) Advised as to the radiation exposure reports which workers may request pursuant to § 19.13.

(b) In determining those individuals subject to the requirements of paragraph (a) of this section, licensees must take into consideration assigned activities during normal and abnormal situations involving exposure to radiation and/or radioactive material which can reasonably be expected to occur during the life of a licensed facility. The extent of these instructions must be commensurate with potential radiological health protection problems present in the work place.

Signature and date of Trainee

APPENDIX K: GUEST BADGE POLICY FOR RADIATION DOSIMETRY

1. Guest badges may be issued to Permits upon request to the Menlo Park Radiation Safety Committee (RSC). Guest badges are intended for two situations: a) use by visiting radiation workers who, in the course of their work, are likely to receive in a year an occupational dose in excess of 500 mrems or are working with quantities of beta-gamma emitting licensed materials in excess of 1 millicurie, and b) use by visitors not using by-product material or radioactive sources, but working in a radiation use area. Visiting radiation workers who, in the course of their work, are likely to receive in a year an occupational dose in excess of 100 mrems (Appendix J) shall have 4 hours of training as outlined in the Radiation Safety Manual before beginning work and shall work under supervision of a USGS radiation worker. Visitors working in a radiation use area, but not themselves using by-product material or radioactive sources, shall receive an orientation to safe practices while working in the radiation use area.

2. Each Permit shall maintain the following Records for each guest badge assigned to a visitor.

a) Badge Number
b) Dates of Use
c) Full Name
d) Social Security or appropriate Identification Number
e) Date of Birth
f) Professional Affiliation
g) Contact Information
    a. Phone Number
    b. E-mail
    c. Mailing Address
h) Radiation User Designation (Handler or Non-User)
i) Training Dates for individuals working in or frequenting restricted areas
j) Documentation of Radiation Safety Training or Orientation (Appendix J: "Instructions to Workers Form", Radiation Safety Manual)
k) Dosimetry exposure for quarter during which badge was used

3. All Guest badges shall be returned quarterly to the MPRSC with the regular badges whether used or not. Beginning 3/31/2008, if a Guest Badge is used, an **electronic copy** of the Guest Badge Log accompanying this memo shall be forwarded to the Radiation Safety Officer, and the log will be maintained in the RSC records. The RSC Guest Badge Log shall include all of the above information with the exception of the Social Security Number (d), Date of Birth (e), and the Documentation of Radiation Safety Training or Orientation (j), which will be maintained by the Principle User of the Permit under which the badge was used.

Qualification Statement for Paul J. Kovach to serve as Radiation Safety Officer

Education:

B.S., Biological Sciences, St. Francis College, Loretto, PA 1977

M.S., Radiation Health Physics, College Of Chemical and Nuclear Engineering, University Of Cincinnati 1979

Certification (s):

American Board of Radiology, Therapeutic Medical Physics, Part 1

HAZWPPR (non-current)

Experience:

More than 25 years of progressively responsible experience at Dept. Of Energy sites, nuclear power plants and government service. Specific experience includes:

- Radiological Engineer, DOE Hanford Reservation. Tank farms, Cs/Sr Encapsulation, Laundry, Z-plant (Pu processing and storage)
- Power Plant HP Training services. Develop and conduct HP Technician Qualification Training
- Onsite and Corporate Emergency Planner. TMI and Oyster Creek. Develop and conduct emergency preparedness exercises, develop and maintain plans and procedures, maintain emergency equipment and facilities.
- Power Plant Emergency Preparedness services. Drill preparation and conduct, training, procedure development.
- NRC Project Manager. Regulation development and revision, contract management.
- State Inspector. Conduct radioactive materials inspections and provide radiological emergency response throughout Los Angeles County. Evaluate licensee programs and performance for compliance with license conditions, and County, State and federal regulations.

MAY 25 2011
DATE

This is to acknowledge the receipt of your letter/application dated 5/24/11, and to inform you that the initial processing, which includes an administrative review, has been performed.

☑ There were no administrative omissions. Your application will be assigned to a technical reviewer. Please note that the technical review may identify other omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card:

The action you requested is normally processed within 90 days.

☐ A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 575224.
When calling to inquire about this action, please refer to this mail control number.
You may call me at (817) 860-8103.

Sincerely,

Carol R. Hill
Licensing Assistant

NRC FORM 532 (RIV)
(10-2010)

BETWEEN:

Accounts Receivable/Payable
and
Regional Licensing Branches

[FOR ARPB USE]
INFORMATION FROM LTS

Program Code: 03610
Status Code: Pending Amendment
Fee Category: 3L 3P
Exp. Date:
Fee Comments:
Decom Fin Assur Reqd: N

License Fee Worksheet - License Fee Transmittal

A. REGION

1. APPLICATION ATTACHED

Applicant/Licensee: INTERIOR, DEPARTMENT OF THE
Received Date: 05/25/2011
Docket Number: 3013620
Mail Control Number: 575224
License Number: 04-06674-07
Action Type: Amendment

2. FEE ATTACHED

Amount: ~~_____~~

Check No.: ~~_____~~

3. COMMENTS

Signed: Carol L Hiee

Date: 5/25/11

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered / /)

1. Fee Category and Amount: _____

2. Correct Fee Paid. Application may be processed for:

Amendment: _____

Renewal: _____

License: _____

3. OTHER _____

_____

Signed: _____

Date: _____